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THE CONNEXION OF AGRICULTURE WITH OTHER SCIENCES, AND REMARKS ON SOILS AND MANURES.

To the Editor of the Farmers' Register.

The dependence of every thing connected with human existence on agriculture, has often been remarked. That she, in her turn, should receive aid from almost every other science and art, displays beauty and harmony in the economy of nature. In this state of things, it were idle to contend with the enemies of book-farming. Knowledge, valuable to any man, is so also to the farmer. Degraded indeed would be the art, if it could gather light from no source but itself. But when philosophically drawing contributions from all quarters, and applying them to its own purposes, it shines in its full glory.

It has long been thought that the benificent creator had probably supplied every arable part of the world with the means of fertility. Whether this be literally true or not, we find that discoveries are continually making, calculated to produce fertility in the earth. The benefits arising from the application of calcareous manures in England and Scotland are utterly incalculable. The accounts of wonderful fertility produced in the originally barren sands in some parts of the Netherlands, chiefly by means of Dutch ashes, almost transcend belief. In our own country, we have reason to hope, that the tide-water districts will soon undergo a signal renovation by the application of shell-marl. Shall we, in the central districts, submit to the belief, that these aids are denied to us, and that we must rely alone on the evanescent benefits of putrescent manures? Or shall we court the aid of mineralogy in our own region, and search for treasures in the bosom of the earth to enrich its surface? It is certain that there is but little limestone between tide-water and the mountains. Yet it is believed that this has not been sought with sufficient diligence. We must then look to other mineralogical objects, containing lime or some other fertilizing ingredients. Knowing scarcely any thing of mineralogy, I approach this subject with great diffidence, and only because none better qualified will undertake it.

The district in question is perhaps as variable in soil as any whatever. While I would not admit, that in all cases, the surface of the earth receives its character from what is called *detritus*—that is, from the materials of the substratum decomposed, yet probably this is generally the case in primitive formations. In travelling from tide-water to the mountains, we cross innumerable veins of land, differing widely in texture and quality from each other, however contiguous. On examination, these stripes of land are found to contain small particles and fragments of the rocks forming their substrata —and close observation leads to the conclusion, that the character of the soil depends much on the materials of which these rocks are composed. Some of these veins have considerable breadth, and in length extend through many of our counties, as that excellent range of land passing near Charlottesville and forming one of the finest tracts of country in the state. This range principally rests upon hornblende rock combined with iron in such proportions, as, by the carbonizing of the latter, causes a rapid disintegration of the rock. The peculiar argillaceous loam thus produced, forms earth, which in capacity for improvement to a certain extent, is perhaps not surpassed by any in the world.

There are innumerable other ranges of hornblende in that part of the state lying within sixty or eighty miles of the Blue Ridge. Indeed, in a great part of the country alluded to, a little of this material may be found on almost every farm. There is, however, less iron in it, apparently, and of course, the disintegration is slow, and the rocks generally near the surface. Unlike the hornblende in the grand range first mentioned, which rises even to the mountain-tops, that, in these smaller ranges, is swallowed up in the high ridges, and its out-croppings appear principally in ravines and near the water courses; so that the ranges have their continuity broken, affording interrupted spots of fertile or improveable land, preserving a course parallel to the mountains.

Wherever this rock is found, its fertilizing properties are displayed in the soil about it. I would ascribe this to its containing lime in greater or less quantities. This has been proved by analysis, and may be inferred from clay-marl being occasionally an accompaniment of hornblende. I saw, some months past, on the land of James Wilson, Esq. of Prince Edward, a bed of marl lying upon this kind of rock—and many marly concretions adhering to the rocks, not only in the bed, but to those on the surface. I have also recently seen on the lands of Colin Stokes, Esq., of Lunenburg, a bed of marl—appearing to the eye, the richest I have ever met with—incumbent on a very extensive bed of soft stratified hornblende. That a rock enriching its environs by disintegration, and forming marl by decomposition, would, if broken by art, improve the character of the soil on which it might be spread, cannot be doubted. But, we are assured by Professor Eaton that it has been found by experiment to possess this property. (See Farmers' Register vol. I. No. 4, p. 248.) Although this substance should not be spread as manure, after pounding or otherwise comminuting, its existence in a soil is well worth observing, as it indicates such to be the very soil for improving more, especially by means of clover and plaster.

I have frequently observed gravelly hills, such as while in woods are covered chiefly with post-oak and hickory, to be remarkably free land, particularly in the growth of tobacco. Much of the gravel is found on examination to be feldspar, having smooth reflecting surfaces, often inclined to a flesh color. The soil looks thin, and I never could account for its fertility, until I learned that feldspar contained both lime and potash. The latter ingredient sometimes rises as high as fourteen per cent. Potash being deliquescent, would run off with the water, as fast as the gravel de-

composes, unless means are used to fix it, by combination with other manures. Every one acquainted with such land, knows how kindly it improves when properly aided.

There is a body of clay land about Buckingham Court House of great value, and particularly famous for the production of wheat. This soil seems to owe much for its vigor of constitution to the large proportion of argillite, or clay slate, which enters into its composition. There is also a happy admixture of hornblende in this soil, as is evinced, by the quantity of dark green or black sand observable in it. These lands are generally in the hands of those, who know their value, and what to do with them; and a continued improvement is confidently expected. This, most probably, with the river bottom, will eventually form the best *gold regions* in that county. After some interruption by the high ridges, the same range (as the writer believes) crosses the Appomattox in the neighborhood of Trent's mill and Patterson's tavern. Here, however, there is a much larger proportion of fine black sand. May not what are called the Green Spring lands in Louisa, belong also to the same range?

The lands between Cumberland Court House and the Appomattox, commonly called the Guinea lands, have often been admired as a remarkably fine specimen of sandy loam. This body of land seems to belong to the same range, with that on Bush and Sandy rivers in Prince Edward, and to possess about the same characteristics. In its virgin state, it could scarcely be surpassed in its free and kindly qualities. The quantity of sand contained, makes it, of course, easy to wash; and the culture of corn, oats, and tobacco—the two first great exhausters, and the last almost the entire monopolist of manure—has reduced much of it to poverty. This range of land, whenever it becomes the subject of meliorating treatment, must make most grateful returns, and display fertility rarely seen. Its improvement has, in many instances, been judiciously attempted, with the promise of abundant reward. The peculiar adaptation of this range to the crops above mentioned, and its unsuitableness to the best growth of wheat, operate—under the miserable state of our avenues to market—as discouragements to its improvement. It is founded on slaty hornblende and feldspar, and particles and gravels of these may generally be readily found, interspersed through the soil. In some places, these minerals seem to be blended, forming what I consider to be the rock, called by mineralogists, sienite. From the tendency of the substratum to decomposition, the soft light earth lies deep upon the rock, in many places, in others, the rocks may be found near the surface.

Numerous other ranges might be pointed out, but the foregoing may suffice to show, that in our primitive formation, the earth generally is *anallu-vion*, that is, formed from the decomposition of the rocks below, and that its capacity for improvement depends much upon the constituent principles of these rocks. This being the case, the question might arise, on the propriety of pounding and conveying, for short distances, such rocks as seem to contain substances calculated to increase the capacity of land for improvement. At least the earth, about such rocks, might be removed to weaker lands. On almost every farm, spots may be found, possessing a constitution superior to the remainder, and affording strong grounds to suspect, that they contain materials, which by their chemical powers might act beneficially on other lands. It is well known, that lime, soda and potash and probably magnesia, are, when properly used, excellent manures; and it is much to be desired, that scientific gentlemen would search out and describe the minerals containing these manures, so that farmers may know how to avail themselves of their benefits.

Chemistry may be expected to contribute more largely to agriculture than any other science. Indeed, it runs, directly or remotely, into almost all that concerns the latter. We will, however, at present notice only its agency in the preparation and application of putrescent manures.

On this subject disputes have been endless. Some, contending that manures should be thoroughly rotted, others, that they should be used in a cruder state; some holding that they should be deeply buried, while others maintain that they should be applied to the surface. Manures supply the food of plants to the earth, and they improve its texture mechanically, preparing it to become a more suitable bed for their roots. The chief concern therefore—as was observed by the writer of one of the most valuable articles in the Register, whose words I cannot now quote—should be, to prepare and apply them in great abundance; and he who does this most diligently, is apt to succeed best. While this is true among us, when we devote very little attention to the subject at all, yet were all equally diligent in this matter, it would be found that he would succeed best who exerted most skill.

Vegetable substances, when thrown into a large mass, go into fermentation, and portions of them become soluble in water. Such portions are then thought to be in the proper state for nourishing plants. If this fermentation be kept up longer, portions of them become (if I may use the expression) soluble in air; that is, they are liable to be converted into gas, and to be lost. And the whole pile, however large, would eventually be evaporated, except an inconsiderable residuum. Various expedients have been resorted to, in order to save these volatile portions, by causing them to be absorbed by light earth or other materials. It is probable, however, that this may be unnecessary, should we ever reduce this most important branch of husbandry to an *art*, with a clear understanding of its theory.

The various operations connected with the business of manuring are most commonly performed rather according to convenience, than directed by judgement. Our corn-stalks, straw, leaves, &c. are drawn together when it best suits us; they lie in the farm-pen or stable-yard, exposed to the weather, until convenience allows, or necessity compels us to drive them out. I apprehend that considerable increase might accrue in the value of our manures, were the materials of which they are made, kept under shelter, until they are sufficiently impregnated with animal matter, to cause a brisk fermentation as soon as they are heaped and artificially watered, or exposed to the weather. The mass then might be equally rotted, and the vast drain of saline and other soluble matters, usually produced by drenching rains, might in a great measure, be prevented. Fermentation goes

on, in such heaps, as well and perhaps with less waste, in cold weather, than in warm. Such heaps might be made once in two weeks, through the winter, and often matters might be so arranged, as to render it a convenience to haul out manure as a return load, while drawing materials for making more into the farm-pen. And this, I think, would be more than a mere convenience, as I hold that the sooner manure is applied to the soil, after it is made, the better. Some expense would arise in erecting suitable shelters, but this would soon be amply repaid in the increase in quantity and quality of the manure, and comfort and consequent improvement of the stock. In a well littered farm-pen, exposed through the winter to the weather, much of the richer parts must rise, even in cold weather, to the gaseous fermentation, and be wasted. The same litter, sheltered, would not ferment, for lack of moisture, during the short time allowed for its impregnation with animal matter. Indeed, it is doubted, whether—should it be necessary—it might not be kept free from fermentation through the whole winter. I think it also certain, that, while not chemically fermenting, its loss would be trivial.

Much has been said, on the subject of applying manure to land, and many directions given about heaping it and carefully covering the piles with earth, to save the escaping gases. After all, I doubt whether it be not best to spread it at once over the surface. While kept in heaps, chemical action must go on. This produces an evolution of gas; and though much of this may be caught by the covering of earth, yet this is taken from the heap below, and leaves it weaker. If, after sufficiently rotting manure at the farm-pen or stable, it be equally spread over the surface, little or no chemical action can occur. It is true, the sun and air speedily dry the water out of it. But this is very different from the chemical fermentation employed in rotting it, while in heaps. After it once gets dry, it can lose no more, not even of moisture; and when it rains, its soluble matters go into the earth, where they ought to be, mouldering and mellowing the clods, and preparing the land to produce a fine crop. Who has not seen—after a rich dressing of manure has been hastily buried under a poor clay—the clods remaining obdurate, with great detriment to the crop, throughout the season? And who has not seen a summer cow-pen, which has not been ploughed till the next spring, surpass in crop, an adjoining one, which was well turned over in the fall?* This experiment, I have repeatedly made; and have fancied that the advantage gained, was protracted beyond the first year, by the kindly condition in which this treatment left the soil—especially, when the land has been in a short time, laid down in grass. But, even if the benefit lasted but for one year, the speedy return from such an investment of manure, would be worth considering. It is, however, granted that no harm can result from a deep burial of manure, in a loam sufficiently rich and mellow to nourish the young plants, until their roots can strike down to it. But, even here, it might be doubted, whether benefit might not be derived from exposing the manure to one or two rains before ploughing it in. Some of the best practical farmers in Virginia have adopted the plan of top-dressing, not only with prepared manures, but also with fresh straw—the soluble portions of which are readily yielded to water. And the practice may reasonably be defended, until it can be demonstrated, that the sun and air exert a material chemical action on a thin stratum of manure.

A proposition in agriculture, has been too fully demonstrated, to need an attempt at confirmation here, which the improving farmer should always bear in mind. It is this*—that a soil cannot, by the best rotation of crops, aided only by the use of putrescent manures, be permanently kept at a grade of fertility above its natural standard, or that which it held before clearing—or, in other words, that every soil has its natural grade, as regards its capacity for improvement, and that this grade depends upon its approach to that happy combination of sand, clay, and lime,† which constitutes the perfection of a soil. An attention to this doctrine will lead us to apply putrescent manures largely, only to those soils which seem to have a large capacity for retaining them, while we endeavor to keep the weaker soils up to their standard of fertility, by a mild rotation, and occasional meliorating crops; using diligently whatever opportunity may offer itself, for elevating their grade, by the use of permanent manures.

The foregoing remarks are offered, with a sincere conviction of the importance of the subjects, and with the hope that more experience, talent, and science may be brought to bear upon them.

M. N.

* The attention of the writer was drawn to the subject of surface manuring, many years ago, by something written by one of the venerated compeers of Col. Taylor. Since writing the article above, I have received my March number of the Register, and find, if I may judge from the initials, and from the well known cheery style—something on the same subject from the same hand. May the periodical numbers of the work long be enlivened by the effusions of this writer, who has devoted so much of his life, to the service of his country!

STATEMENTS OF THE CONSTITUENT PARTS OF SOILS OF THE PRAIRIES OF ALABAMA.

To N. Herbemont, Esq.

Columbia, March 10, 1835.

Dear Sir,—I have read in the Farmers' Register at pages 277 and 367 of Vol. I. the articles on the prairies of Alabama, extracted from the Southern Agriculturist, and in them recognize the hand of a valued friend, whose intelligence and experience impart more than ordinary value to his opinions. As I know you are in correspondence with the editor, to whom I am unknown, I will supply you with a few facts in relation to the soil of this interesting region, which, if you deem them worth preserving, you may transmit to him.

The description of the surface, soils, and ap-

* See "Essay on Calcareous Manures." The book being lent out, I cannot quote verbatim.

† That lime exists, in every soil capable of production, either in a combined or free state, has been fully proved. It is believed, however, that those soils containing a little lime in a free state, and ready for combination with putrescent manures, are best.

pearance of that region, given in the articles referred to, over the signature of "A Planter," is complete; the facts I will now furnish relate to the analyses of some of the varieties of soils. The analyses were made by Drs. Cooper, Nott, and Gibbs. The notes furnished me are not very complete.

The first was a sample of the bald prairie, from the plantation of Col. Deas, lying on Big Swamp, Lowndes county. It is not known at what precise depth it was taken. It contained twenty-five per cent. of carbonate of lime—twenty-eight of vegetable matter: the balance not stated in the paper lying before me.

The second, was from the same plantation, and a sample of slue prairie. It contained fifteen per cent. of carbonate of lime—twenty-five of vegetable matter—the rest aluminous earth and a small quantity of silex and iron.

The two next samples were from the plantation of Elmore and Taylor, on Pintlala Creek, Montgomery county, taken from the open prairie. It was taken up with great care, the earth being first removed to the depth of six inches, and a sample then taken up; the earth was then removed to eighteen inches depth and a second sample taken up, and both carefully wrapped up and labelled on the spot. The analysis resulted as follows:

The first, taken six inches below the surface, yielded carbonate of lime, thirty-eight per cent.—vegetable matter twenty per cent.—silex, alumina, oxide of iron forty-two per cent.

The second specimen, taken at the same spot and eighteen inches below the surface, yielded carbonate of lime forty-eight per cent.—vegetable matter twenty-nine per cent.—silex, alumina, oxide of iron, &c. twenty-three per cent.

The two last developing a fact most remarkable, an increase of vegetable matter as the ground is penetrated.

I will only add one other fact, leaving it to others to explain the cause. On the same plantation, there is in one of the fields, one of those bald prairie hills, where the soil is nearly white. It has now borne its seventh crop of corn, being unfit for cotton. When first planted, it scarcely produced seed—but every subsequent year its product rapidly increased, without manuring, till its crops have been some years estimated at forty bushels of corn to the acre. The last two years, a few cotton seed have been thrown into the hills, with manifest advantage. I have seen one other field of the like kind, where the result has been precisely alike. When I saw it three years ago the crop was estimated at forty to fifty bushels of corn.

The soil in these two fields is very similar to that analyzed in the two last experiments, the difference being something in color, that analyzed being a few shades darker. The only apparent cause for the increased fertility of these soils, under cultivation without manure, is the action of the air upon the earths, and the small addition of vegetable matter from the corn-stalks and grass.

I will, in conclusion, state that it is very probable that I may receive specimens of more varieties of these soils in the course of this spring, and if I do, they will be given up for a like examination.

E. ———.

[To the foregoing very interesting statement (in which there is nothing wanting except the greater authority which the writer's name would have given,) we will add some similar facts obtained from partial analyses, (limited to ascertaining the proportions of calcareous matter only,) of other prairie soils. It was with the view of prosecuting these examinations that we have more than once asked for specimens of prairie soils—and we are much gratified to have here the results obtained by others, of much higher credit and authority in chemical investigations. We have been the more forcibly impressed by the highly calcareous nature of the prairie soils, so far as we have been enabled to know any thing of their composition, from having before ascertained the still more remarkable fact, that (so far as examined) almost all the lands now, or formerly, covered with wood, and even alluvial lands, contain not an atom of carbonate of lime. This we are sure of as to Virginia, and have as yet found no difference in the soils of other states. It may be that the quantity of lime in the prairie soils is the primary cause of the strange absence of trees—that to the same cause may be attributed the like peculiarities of the vast *steppes* of Tartary and Russia, and the *Pampas* of South America—and that to the more general diffusion of calcareous earth in European soils, is attributable the general difficulty found there of raising trees, the growth of which in our part of America, can with difficulty be destroyed, and is renewed as soon as the labor of man is merely withdrawn. We invite others to aid in investigating this subject, and to show whether these are baseless speculations, or suggestions of some value. Before this cause of the formation of prairies occurred to us, there appeared no rational means for explaining the strange facts connected with them. Most persons are satisfied to attribute their formation to the annual fires made by the Indians. These fires are doubtless the immediate agents of the destruction of growing trees—but could not have had that effect unless the soil was far more favorable to the growth of rank grass than of trees, so as to furnish abundant fuel for the destruction of the latter. Fires were as frequent on the Atlantic coast, without producing a single prairie. But this is wandering too far, until more facts are furnished. The few of like kind which follow, are extracted from the second edition (now in the press) of the Essay on Calcareous Manures.]

The only soils of considerable extent of surface which, from the specimens that I have examined, appear to be highly calcareous, and to agree in that respect, with many European soils, are from the *prairies*, those lands of the west which, whether rich or poor, are remarkable for being destitute of trees, and covered with grass, so as to form natural meadows. The examinations were made but recently, (in 1834) and are reported because presenting striking exceptions to the general constitution of soils in this country.

20. Prairie soil of the most productive kind in Alabama, is a black clay, with very little sand, yet so far from being stiff, that it becomes too light by cultivation. This kind of land is stated by the friend to whom I am indebted fer the specimens, to "produce corn and oats most luxuriantly—and also cotton for two or three years; but after that time cotton is subject to the rust, probably from the then open state of the soil, which by cultivation

has by that time become as light and as soft as a bank of ashes." One hundred grains of the specimen contained eight of carbonate of lime. All this prairie land in Alabama lies on a substratum of what is there called "rotten limestone," (specimens of which contained seventy-two to eighty-two per cent. of lime,) and which rises to the surface sometimes, forming the "bald prairies," a sample of the soil of which (21) contained fifty-nine per cent. of carbonate of lime. This was described as "comparatively poor—neither trees nor bushes grow there, and only grass and weeds before cultivation—corn does not grow well—small grain better—and cotton soon becomes subject to the rust." The excessive proportion of calcareous earth is evidently the cause of its barrenness.

The substratum called limestone is soft enough to be cut easily and smoothly with a knife, and some of it is in appearance and texture more like the chalk of Europe, than any other earth that I have seen in this country.

22. A specimen of the very rich "cane brake" lands of Marengo County, Alabama, contained sixteen per cent. of carbonate of lime. This is a kind of prairie, of a wetter nature, from the winter rains not being able to run off from the level surface, nor to sink through the tenacious clay soil, and the solid stratum of limestone below.

23. A specimen from the very extensive "Choctaw Prairie" in Mississippi, of celebrated fertility, yielded thirteen per cent. of carbonate of lime.

From the [British] Quarterly Journal of Agriculture.

ON THE MAKING OF BUTTER AND CHEESE IN THE DAIRY DISTRICT OF SCOTLAND.

By Mr. William Aiton, Hamilton.

On making Butter.

Milk, as it comes from the cow, is composed of three substances, viz., an oily or butyraceous matter, a lactic or caseous substance, and serum or whey, all in mechanical mixture; and these are separated by the operations of the dairy, and each of them converted to its proper use as human food. It is the oily part only that can be formed into butter; and that is done by churning or agitation, either of the whole mass of the milk, or of the cream only. As the preparation for churning is different in these, it becomes necessary to describe both, so as any person in the least acquainted with the qualities or management of milk, may understand how to extract the butter it contains, by the one process or the other as may best suit his purpose.

Milk may be churned, and the butyraceous matter in it collected, whenever it is drawn from the cows; but, as that oily matter does not separate from the lactic matter and serum until the mass has become sour, it is much better to allow the milk to acidify naturally before it is churned, than to force it into that state by protracted agitation in the churn. For when butter is forced from sweet-milk, the churning has to be continued till it becomes sour, by the absorption of oxygen, during the course of churning, and in that case the butter is always very soft. But when the milk has acidified naturally, before it is churned, that operation is as speedily and easily performed on the whole mass of milk, as when the cream has been separated from the milk and churned by itself.

Formerly milk and cream were thrown together as they came to hand, and either sweet or sour as they happened to be, and the whole stood over till it was convenient to churn the mass; and that slovenly way of management is still practised by many farmers. But wherever sweet-milk and sour-milk are mixed, the former is forced into premature acidity, and the coagulum of the latter being broken, the whole mass becomes fermented, throws off its serum, soon becomes rancid, and communicates that taste to the butter; while the butter-milk continues in a state of fermentation, and does not again unite with the serum, but forms itself into curds and whey, having a rancid, musty flavor and taste.

Fortunately a great improvement has been effected in the important process of making butter and butter-milk far more palatable and wholesome than was practicable by the ill conducted operations which have been described. And as it has been often termed the "Mearns" plan of making butter and sour milk, it is probable it had its origin in that parish, where these articles of food have long been manufactured to a great extent for the Glasgow market. Be that as it may, the mode of making butter and sour milk, all over the dairy district of Scotland, is nearly the following:—

The milk, when drawn from the cow, is placed from six to twelve hours in coolers, the same as when set aside to cast up its cream, but this is merely to let the milk cool. And whenever it is completely divested of its natural heat, the whole meal of milk is emptied from the coolers into a stand-vat or tub sufficient to contain the whole. If the vat is large, and a second meal of milk has become cold before the former meal has begun to acidify, the second may be turned into the same vat with the first. But if the first has in the least become sour, or is found to be approaching to acidity, the second meal of milk is placed into another vat by itself, to prevent its being soured otherwise than in its own natural course. A lid or cover is thrown over the vat which contians the milk, and it is allowed to stand undisturbed till the milk has not only acidified, but till it has been formed into a coagulum, (or "lapper" in dairy language.) Whenever it comes to that state, it is ready to be churned, but it can be allowed to stand over till as much is ready as may be convenient to churn at the same time, and the milk is no way injured by remaining in coagulum for several days, provided that it is not disturbed, or the lapper broken; but if that is done before churning can be commenced, the serum separates from the caseous and oily parts, and the whole mass ferments.

When the churning is commenced, the milk that has not soured and coagulated is not churned. If any milk not fully lappered were to be churned with the other, the butter would not be hurt by that milk, but the butter-milk would become fermented, run into curds and whey, and soon acquire a rancid taste and smell. But when the whole milk has lappered before churning is begun, and where every thing is rightly conducted, the sour-milk, if kept in a cool place, and in clean dishes, will have a mild and pleasant acid taste, and the lactic parts will not separate from the se-

rum for a good many days after churning; and the butter manufactured in that manner will be found to be every way as good as that made from cream alone, or in any other way whatever. If the cream has been several days in collecting, and been allowed to throw off its serum, or stand long exposed to the atmosphere, before it is churned, the butter from it, however oily, will not have such a fine taste as that made from the whole milk managed in the way herein pointed out.

Milk prepared in this manner is churned in upright or plunge churns, of a size to suit the magnitude of the dairy. Where only a few cows are kept, the churns will contain about fifty Scots pints (100 quarts,) but, in larger dairies, they generally contain from 100 to 120 Scots pints, and some still larger. These large churns are, on some farms, moved by machinery, of various construction; but, in the greatest number of dairy farms, churns of 100 pints, or more, are wrought by hand labor only, and frequently by the female servants. After the clotted milk has been put into the churn, and agitated for a few minutes, merely to break the coagulum of the milk, as much hot water is poured among the milk as to raise it from 50° or 55°, the temperature of the milk-house, to 70° or 75° of Fahrenheit's scale; one person agitating the milk, while another throws in the water. The temperature of milk must be raised to or above 70°, before the butter can be separated from the milk; and the temperature of milk cannot be so well raised in any other way as by pouring in boiling water among it, when it is begun to be churned. And in this and many other operations of the dairy, every thing regarding temperature should be carefully regulated by the thermometer. This valuable instrument, however, is seldom used in the Scotch dairies, the degree of heat being guessed at from the appearance of the milk. If the milk is too cold when churning, it swells, has a pale white color, throws up to the surface many air-bubbles, and emits a rattling noise. But when the milk is in proper heat, it does not swell, it has a straw or cream color, has a softer sound when agitated, and does not throw up bubbles very plentifully. These appearances no doubt assist the experienced dairy people in regulating the heat of milk under the operation of churning; but surely the thermometer would be a much better guide: for, when milk is either overheated at the time it is churned, or when that operation is too hastily performed, the butter is soft, and of a white color. When the heat of the milk is at the proper height, from $2\frac{1}{4}$ to $2\frac{3}{4}$ hours is the proper time for churning. When milk is of ordinary quality, eight Scots pints (or 24 pints imperial) yield 24 ounces of butter; and, from the water *necessarily* thrown in at the time of churning, the quantity of butter-milk is equal to the milk churned.

The late Arthur Young has said, that butter-milk is only fit to be consumed by swine; and Dr. Dickson seems inclined to devote skim-milk, butter-milk, and whey, to the feeding of pigs; but the laboring people in Scotland and Ireland use vast quantities of these as food to themselves and their children, and are happy to get them at a penny per Scotch pint, or two quarts.

Another method of making butter, and one most frequently followed, is to separate the cream from the milk and serum, as completely as possible, and to churn the cream by itself. When this method is followed, the milk, when drawn from the cow, is placed about three inches deep in coolers of wood, or of iron tinned in the inside, or of stoneware; and it is allowed to stand in the milk-house, at a temperature of 50° or 55°, till the cream rises to the surface. In the dairies where the milk is formed into butter and skim-milk cheese, the milk is generally allowed to remain in the coolers from 36 to 48 hours, in order to obtain the whole cream. In Holland, the milk is not allowed to stand in the coolers more than from 16 to 24 hours, which is one of the reasons of the Dutch butter being of superior quality to ours. The first cream that rises to the surface is always richer, and yields better butter than that which is longer in coming to the surface. On this account, some who want butter of the first quality, take off the cream at six hours' standing, and skim the milk a second time for butter of inferior quality. If the milk stand in the coolers from 24 to 30 hours, the butter will be better than when it stands 48 hours; because the cream that rises after 24 hours, is of inferior quality, and the milk and cream, when too long exposed to the air, are greatly injured.

The cream is taken off the milk, either with a skim-dish, or by pouring it carefully over the lip of the stand-vats or coolers. And it is placed in a vat till as much is collected as may be convenient to churn together. The cream in that state soon acidifies, and the oily matter, with some portion of the milk in the cream, are formed into a clotted state over the serum; if it remains long unchurned fermentation commences, mouldiness soon covers the surface, and the whole mass acquires a rancid taste. To prevent these evils, the cream ought to be well stirred twice every twenty-four hours, with a stick, from the time it is skimmed off the milk till it is churned.

Cream thus separated from milk, is an oily substance. When taken off the milk, it contains a portion of milk, which is separated by percussion or churning. When new, cream forms a rich and delicate food, either by itself or under various modes of cookery; but its most common use is in the shape of butter.

Cream is churned in vessels of various forms and dimensions, as upstanding plunge-churns, barrel-churns turned round with a handle, and patent box-churns. But whatever their form be, or the power by which they are worked, the effect is to break and shake the cream, till the oily part of the mass be separated from the milk, and formed into butter. The cream must be raised to 70° or 75°.

Churning of cream should be neither too hurriedly nor too slowly performed. Two hours is the shortest period in which it can be done with safety, but it need not be protracted longer than two hours and a half; and the operation should be carried on steadily, from its commencement to its termination. When the churning is carried on rashly, or the cream too much heated, either by churning or the admixture of hot water, the butter is too soft and of a white color. If the cream have become rancid, that disagreeable taste and flavor will not be removed by churning, but will extend to the butter and butter-milk.

Whenever the butter is made in the churn, it is removed from the butter-milk, and well washed,

in at least three or four changes of clean spring-water, as cold as it can be found. If the butter is very soft, and the weather hot, it should be allowed to lie for ten minutes or so in the cold water, to harden, before it is much beaten. But when that is done, or when the butter is not too soft, it must be carefully kneaded with a skimming-dish or the hand among the changes of water, till every particle of the butter-milk is expelled; after which, and while the butter is still soft, that part of it which is not to be immediately used ought to be salted, the salt minutely mixed, and the butter carefully packed into vessels or casks, that are air or water tight, and every crevice filled with strong pickle, to exclude air.

The quantity of salt for butter that is not to be eaten for several months after salting, should not be less than half an ounce, mixed with two drachms of sugar and two drachms of nitre, to sixteen ounces of butter. The sugar improves the taste, and the nitre gives the butter a better color, while both of them act with the salt in preserving the butter from rancidity. If the salt is not minutely mixed into the butter, that on which it rests will have a yellow or brownish color, while the rest will be of a white color, which, in dairy language, is termed "pyety butter," that brings an inferior price. But although the butter has to be kneaded among the water, and the salt well mixed into it, care must be taken not to bake or knead it too much, otherwise it will become tough and gluey.

As butter, in its purest state, still contains a portion of the milk and serum from which it is extracted, it should not be much exposed to the air, from which it soon attains a rancid taste; that, however, may be partially removed, by kneading in pure water, mixed with a portion of alcohol, but never entirely remedied. In the county of Aberdeen, butter is formed into a lump, without being salted, and remains exposed to the atmosphere for a week or longer, till the merchant send round his cart, to collect what he can find in the district; and when convenient, some time after, the whole butter so collected, is trodden with bare feet into one mass, the salt mixed into it, and then packed into firkins. This seems to be a very slovenly way of managing butter, and when treated in that way, it cannot fail to acquire a rancid taste.

When butter is made from rich well-flavored milk or cream, and every thing about the manufacturing of it properly managed, it has little smell, a mild agreeable taste, and forms a pleasant and wholesome food. When completely divested of impurities, it possesses the properties of oil. Butter begins to melt at the temperature of 96°, when the pure oil floats over the remains of milk or other impurities; and this process of purification requires to be done before it can be carried to a hot climate.

The qualities and flavor of butter are influenced by the cattle from which the milk is drawn, still more by the food which they eat, and, most of all, by the manner in which the butter is manufactured. Some breeds of cattle, and individual cows of every breed, give richer milk than others. Cows that are too young, or too old, and those that are unhealthy, or lean, never yield good milk. When fed on old pasture, or when they are fed on grain or green food during winter, they give richer milk, and more copiously after calving, than when stinted in their food. When fed on turnips, cabbages, clover, and sown grasses, the cows, if in good habit, give copious draughts of milk; but the butter made from them is not of so good a quality, as when they are fed on old though inferior pasture.

The history of making butter in ancient times is but imperfectly known. Butter is no doubt mentioned in Scripture; and, in one place, it is said to be brought forth by "churning of milk." But Professor Beckmann and others say, that the Hebrew word translated "*butter*," should have been rendered *milk or cream*. And surely the bringing "forth butter in a lordly dish," cannot be well made to apply to what we now give that name. From butter not being mentioned by any of the ancient Greek poets, it may be supposed that it was not known to that wise and brave people. The ancient Romans knew nothing of butter, till they were taught by the Germans how to make it; and it was not used as food by the Romans, but merely as oil. Herodotus says, that the Scythians formed butter, by shaking or agitating mare's milk; and the poet Anaxandrides says the Thracians ate butter, at which the Greeks were surprised. Dioscorides says that good butter was prepared from the fattest milk of sheep and goats, by shaking the milk in a vessel, or, more probably, in a leathern bag. And Galen says, the fattest butter was obtained from the milk of cows. When Julius Cæsar invaded England, he found that the inhabitants had abundance of milk, from which they made butter, but could not make cheese, till they were taught that art by their invaders. From that period butter and cheese have been made in Britain; though, till lately, in a slovenly manner.

On making Cheese.

Cheese is formed chiefly from the caseous portion of milk, either with or without the cream.

Cheese and the curdling of milk are mentioned in the book of Job. Homer mentions cheese as forming part of the ample stores found by Ulysses in the cave of the Cyclop Polyphemus. David was sent by his father Jesse to carry ten cheeses to the camp, and to look how his brethren fared. "Cheese of kine" formed part of the supplies of David's army at Mahanaim, during the rebellion of Absalom. Euripides, Theocritus, and others of the early poets, mention cheese. Ludolphus says that excellent cheese and butter were made by the ancient Ethiopians; and Strabo says, (lib. iv. p. 200,) "some of the ancient Britons were so ignorant, that though they had abundance of milk, they did not understand the art of making cheese." It must appear strange, that a people so active as the ancient Romans, though able to instruct our ancestors to make cheese, did not know how to make or use butter. There is no evidence, however, that any of these ancient nations had discovered the use of rennet in making cheese, but seem merely to have allowed the milk to sour, and to have formed their cheeses from the caseous part of the milk, after expelling the serum. As David, when too young to carry arms, was able "to run to the camp" with ten cheeses, ten loaves, and an ephah of parched corn, the cheeses must have been of very small weight.

It is not known, or likely ever to be discovered, when or by whom the use of rennet in coagulating milk was discovered. It does not appear that any material improvement in making cheese had been made in Scotland after the use of rennet was known, until about the middle of last century, when full-milk, or Dunlop cheese, began to be made in the Bailliary of Cunningham, in the county of Ayr. But by whom that cheese was first made has not been discovered. The Rev. Mr. Brisbane, minister of Dunlop, has introduced a traditionary story into his account of that parish, of a woman of the name of Gilmour having been taught in Ireland, whither she had fled during the persecutions before the revolution in 1688; and on her return to Scotland, introduced that art into her native parish. If it could be shown that any such cheese was then made in Ireland, the story would be more worthy of credit. It is not certain that the name "Dunlop cheese" proceeds from the parish, or from a dealer in cheese from the parish of Stewarton, whose name was Dunlop. Be that as it may, that species of cheese was begun to be made by some farmers in the Bailliary of Cunningham, prior to the middle of last century; and it has gradually extended over the counties of Ayr, Renfrew, and Lanark, and in Galloway. It is not inferior in my opinion to the best cheese that is made in England or in Holland, and its character continues to gain estimation.

Wherever as many milch cows are kept upon one farm, as their collected milk will form a cheese of a tolerable size, every time the cows are milked, twice in the twenty-four hours, the milk is passed through a sieve, to remove impurities, such as hairs, and collected into a tub of a size to contain the whole milkings. The rennet is then mixed with the milk, and a cloth thrown over the tub till the milk coagulates, which generally happens in ten or fifteen minutes. But as milk should be coagulated at nearly animal heat, and as it must have cooled considerably in milking, passing through the sieve, and pouring into the tub, it might be proper to throw in a small quantity of hot water, to make up the heat that has been lost before the curd is formed. This is done in some dairies, particularly when the weather is cold.

When the cows on any farm are not so numerous as to yield milk sufficient to make two cheeses every day, the milk drawn at night is placed in coolers in the milk-house till next morning, when as much of it is heated as brings the whole, with that of the morning's milking, to the proper temperature for being coagulated; and the two milkings are formed into one cheese. In some of the English dairies, the cream taken off the cold milk is heated so as to make the whole sufficiently warm for being formed into curd; but in the Scots dairies the cream is taken off the milk, and the skim-milk only heated, so as to bring the mass into a proper temperature. Either way may do, but I am partial to the Scotch method, because when the cream is heated, the butyraceous matter in it must be melted into oil; after which I would be afraid the oily particles would more readily go away with the whey than when the cream had never been melted. I know that the English dairy people say, that the fat that goes off with the whey is recovered in the shape of whey-butter; but I consider the butter collected from whey as a species of fraud, committed either intentionally for gain, or more commonly the result of ignorance, and slovenly and unskilful practice. When milk is coagulated at the proper temperature, the curd sparingly broken, and the whey taken off with as little squeezing as possible, the whey resembles sea water, and contains no part of the butyraceous matter that would be possible to collect. It is only when the milk is overheated, or too much broken and squeezed, that butter worth collecting is ever found in the whey.

After the greatest part of the whey has been removed by gentle means without bruising the curd, but cutting and turning it up softly, and when the curd has been brought to the consistency of butter, it is placed in a drainer and cut into pieces about two inches square; a board or lid is then placed over it to compress it with a weight of 40 lbs. or 50 lbs. in order to squeeze out the remains of the whey. As the curd consolidates by this pressure, it is necessary to turn it up twice or thrice, at a quarter of an hour between each turning, and cut the curd as before, and renew the pressure till the whey is expelled. The curd is then cut into small pieces with a knife made for the purpose, and mixed carefully with salt. The salted curd is then placed in the cheese vat, with a piece of thin canvas around it, and subjected to pressure. It is then a cheese. After the cheese has remained under pressure for three hours or so, it is turned out, a dry cloth put round it, and again put under pressure; and this is repeated, twice every twenty-four hours, till the cheese is completely formed. Generally forty-eight hours after it is first put into the press is sufficient for it.

In some of the dairies the cheeses are (after having been once or twice under pressure, and beginning to adhere) put into a hot bath of water for half an hour or so, and being well dried, they are again put under pressure in a dry cheese vat with a dry cloth round them. The intention of the bath is to draw out the whey and accelerate the pressing of the cheese. The water is made as warm as a person can endure the hand in it. This plan, however, has never come into general use, and it is the opinion of some that it has a tendency to soften the cheese too much at the time, and to render it tough afterwards; as every application of hot water to curd has the effect of rendering it tough.

The Scots cheeses are always salted in the curd at the time they are about to be put under pressure, and never in brine, nor by rubbing with dry salt after they come from the press, as is generally done in Holland and Cheshire. Any of these methods of salting may do; but surely the Scottish way is the easiest, and the salt can be given more exactly than in the other methods.

When the cheeses are taken from the press, they are exposed for three or four days to the heat of the kitchen, or some other such place, and turned over twice or thrice every day till they harden a little, and then they are removed to the store-room, and turned every second or third day. In many of the small dairies the cheeses are stored in the barn, on boards laid on the floor. Others place them on the floors of garrets or attic storeys of their dwelling houses. Of these the barn is preferable to the garrets, which are too warm in summer, especially if the house is roofed with slates or tiles, and fire constantly kept in the house. The barn is cool, airy, not too dry, nor

having too much light. But in dairies where the buildings are rightly fitted up, a store-house, having a moderate portion of air, little light, and neither damp nor very dry, should be built near to the dairy-house, and the cheeses placed there on wooden shelves. The sun must not be allowed to shine on the cheeses in the store-house.

Cheeses are never sweated in Scotland, as is common in the English dairies; neither are they ever stored above the cow-houses to receive the breath of the cows to contract a particular flavor. Heating them till they throw off part of their fat, can never make them richer or of finer flavor, but the reverse.

But after all that can be done, cheeses which are made in the same way from the milk of the same cows, and every operation performed alike, will differ considerably in quality and flavor. This diversity is greater in the Scots than in the English cheese, owing probably to the former being made in ill constructed houses, and with imperfect apparatus, while in England the dairies are large, the dairy-houses of superior formation, and the operations more uniformly conducted. Milk is more easily contaminated with the slightest impurities than any other substance in common use. It is fortunate that, while there are diversities in the qualities and flavor of cheese, there are also diversities in the taste of its consumers.

Scots cheeses are never formed of a round shape like cannon balls, as some of the Dutch are; they are rounded on the edges, and flat on the sides; and the greatest part of them are from 15 lbs. to 50 lbs. avoirdupois in weight, many of them heavier. Cheeses of these weights do not readily become tough, dry, and horny, and they of course do not contain so large a proportion of crust, as small cheeses.

Scottish cheese does not swell so readily as the Cheshire and Dutch cheese. That defect does not proceed from the clover or other particular food given to the cows, as some have imagined, but is produced by the introduction of impure air into the milk or curd, or from impure rennet. The extraordinary breaking of the curd in the Dutch dairies, and the skewering of the English cheese, described by Mr. Holland, cannot fail to introduce flatulent air into the curd and cheese, and produce swelling. *Pungency* of taste probably proceeds from the same causes. *Coloring* cheese with arnotto has been practised by some cheesemakers in Scotland, but the practice has never become general, and is not now so common as formerly. Arnotto is a harmless article, but as it has a tendency to dry the cheese too much, and can do no good, it may well be considered as a needless application. The cheeses made in Scotland are neither washed, nor rubbed, nor greased, on the outside, nor painted like some of the Dutch and English cheeses; but merely laid up to dry on clean boards, in a place neither dry nor damp, and turned over; and yet they are free of *cracks* or mouldiness on their crust. Cracks proceed either from the milk having become sour before the cheese was made, or from the cheeses being exposed to too much drought when laid up to dry; and mouldiness proceeds from their being kept in a place that is too damp. Blistering or whey-springs are seldom seen in Scottish cheese.

The Dunlop cheese is generally not so acrid in the taste as most of the English cheese, nor is it so hard and dry as that of Holland; it is softer and fatter than either. A tasting of the high-flavored English or foreign cheese, after a good dinner, may please as a relish better than the softer and milder Scottish cheese; but when a quantity of cheese is to be eaten at luncheon, or a Welch rabbit is desired for supper, it is preferable to the English, which not unfrequently affects the olfactory nerve. Some inferior cheeses are unavoidably made, in even the best managed dairies; and both farmers and cheesemongers may, at times, palm inferior cheese on those who cannot judge for themselves. In making this species of cheese, the average return is one stone of 16 lbs. of 24 oz. to the pound, from every 60 Scottish pints of milk, which nearly corresponds to 179 imperial pints. Dunlop cheese has nevertheless been much improved in the course of the last twenty years, and the demand for it is steadily increasing.

Skim-milk cheese has been made in Britain ever since the Romans taught our ancestors the art of cheese-making. The mode of making it does not differ much from the way of making full-milk cheese, as described above. The milk is in Scotland generally allowed to remain from thirty-six to forty-eight hours in the coolers, in order to cast up the whole cream. This is the greatest defect in the dairy husbandry. It would be better not to allow the milk to stand more than twenty-four hours, as is usually done in the Dutch dairies. By taking off the cream at eighteen or twenty-four hours, a smaller quantity of butter is of course obtained, but it is of superior quality; and the skim-milk by having a part of the fat, and not being too long exposed to the air, is richer for cheese than when the milk is exposed in the coolers for thirty-six or forty-eight hours. Skim-milk coagulates readily. The whey comes freely off the curd, and the cheese is easily formed and pressed.

The whey taken from milk when made into cheese, is partly used by work people as a drink, or made into porridge with oat-meal, but the most of it is given to horses, cows, and swine. The whey from the milk of three cows will, with a small supply of other food, raise a pig of the value of 10s. or 12s. in April to the weight of 15 or 20 stones by December. Some have boasted of collecting butter from whey. It has been shown that when the operations of cheese-making are rightly conducted, no butter worthy of attention can ever be procured from whey, except through gross mismanagement in the making of cheese.

The rennet in general use is formed from the gastric juice of animals, particularly that found in the stomachs of calves, hares, poultry, &c. Various other substances, as acids, alcohol, sugar, and the juices of several species of vegetables, will coagulate milk; but as the stomachs of calves form the most abundant and powerful coagulum yet known, scarcely any other is ever used.

Rennet is prepared in various ways by different people. Mr. Marshall, the eminent agricultural writer, says the stomach, when taken from the body of the calf, should be well cleaned of milk, curd, chyle, &c. and the clean bag salted and placed in an earthen jar for three or four days, till a juice or pickle is formed; after which the bag should be taken from the jar, and hung up to dry for two or three days, to let the pickle drain off, and then it should be returned to the jar, the

mouth of which should be covered with paper, which should remain till the bag is used a year or so after. When the rennet is wanted, the bag is taken out of the jar, a handful of each of the leaves of the sweet-briar, the dog-rose, and the bramble, are boiled together for fifteen minutes in a gallon of water, into which three or four handfuls of salt have been thrown, and when the liquid has been strained and allowed to cool, the bag is put into it, and the longer it remains in the liquid, the stronger and better will the rennet be. A wine half pint (two gills) of that liquor will, Mr. Marshall thinks, coagulate fifty gallons (a hundred Scottish pints) of milk; and he says the coagulum is formed in an hour or two hours and a half, and sometimes not till three hours after the rennet is mixed with the milk.

Rennet is prepared, however, in a very different way in Scotland. So far from throwing away the curdled milk that may happen to be in the stomach of the calf, when killed, or washing away the chyle, both are carefully preserved, and they are found to strengthen and enrich the rennet. It is, in fact, the chyle formed by the gastric juice mixing with the milk in the stomach of the animal that forms the coagulum; and instead of throwing that away, as Mr. Marshall directs to be done, the Scottish dairymaids are at pains to preserve and increase the curdled milk, by giving the calves as much milk as they can drink a few hours before they are killed.

When the stomach is removed from the calf, it is examined, and all impurities, such as straws and other food than milk, are carefully removed. A considerable quantity of salt (two handfuls at least) is put into the bag and on the outside of it, and being rolled up, it is hung near a fire to dry; and it is understood to improve by hanging a year or more before it is used.

When rennet is wanted, the dried bag is cut into small pieces, and put into a jar with a handful or two of salt, and a quantity of water that has been boiled, and cooled to about 65°; or new whey taken from the curd, is poured on the bag in the jar. If the bag is that of a very young calf, a quart of whey or water will be sufficient; but if the calf has been fed for some time, twice that quantity of liquid may be applied. The infusion may be allowed to stand three days or so in the jar, when the liquid is drawn off, and about an English pint (four gills) of water or whey is poured on the bag in the jar, and allowed to remain two days. Both these portions of liquid are mixed, and strained to remove impurities; the liquor is put into clean bottles to be used as rennet, and the bag is thrown away. The rennet, so prepared, may be used immediately, or be kept for several months, as may be convenient. Some put about a dram glassful of whisky into the infusion.

When the rennet is rightly made, a table-spoonful of the liquid will coagulate sixty Scottish pints (120 quarts) of milk in ten or fifteen minutes. I have known milk sufficient to make thirty stones of cheese coagulated by rennet made from the stomach of one calf.

Mr. Marshall says, that, when the curdled milk in the stomach of the calf is used in making rennet, it gives the cheese a harsh taste. But every person who knows any thing about the quality of cheese must know, that the Scottish cheese is seldom so harsh or sharp tasted as the English. I am also disposed to believe that the leaves of the plant which have been mentioned, and of which infusions are mixed into the English rennet, must have the effect to make the cheese swell; while the flavor they must impart to the cheese does not appear very prepossessing.

From the Cultivator.

BOOK FARMING.

We have been told of the following facts, and have only to regret that the like to them are not of more frequent occurrence. A number of intelligent farmers residing in a neighborhood, somewhere, we believe, in Dutchess county, concluded to form a farmer's association—to make a common stock of their knowledge and observation—believing that knowledge, like money, would be productive in proportion to the capital. It was known that A. raised the best horses, and got the best price for them; that B. was far more successful in his wheat and corn crops than his neighbors; that C. reared the finest neat cattle, and kept the best cows and oxen; that D. excelled in sheep husbandry; and, in short, that some individual excelled the rest in a particular branch of husbandry. Each possessed not only some excellence, but some glaring defect in his management. Thus the farm stock of one were sickly, and many died, because the owner did not know how to manage them; another's farm had become dreadfully impoverished, from neglecting the manure, and from close cropping; while the farm of a third was neither fit for plough land, or for sweet grass, on account of the water which every where saturated the soil, and rendered it poachy, cold and sour. Unlike too many now a days, each of these men was conscious he could learn much from his neighbor's practice, which would enable him to manage his farm with more profit—and that he could teach his neighbors something in return. These expectations were amply realized; but as the members lived somewhat remote, it struck them that it would save much time, and be a more sure way of rendering the improvements of all available to each, if they were to write down their practice in the particular branch in which they respectively excelled, and the principles, or science, upon which that practice was based. This was accordingly done; and for their mutual convenience, as well as for the benefit of others, the whole was printed, and these men were afterwards denominated, by some of their envious neighbors, *book farmers*, because they took their instructions from a *printed book*. This did not disturb them: for they got from their book the secrets by which the others had excelled in their particular department, and each profited by the good management of his neighbors. The consequence was, that all gained by the interchange. The defects of all were speedily remedied, and in a few years prosperity crowned their labors; and they now exhibit, we are told, the best models of profitable farming any where to be found in the land; and they enjoy the felicity of reflecting, that while they have greatly benefited themselves and their families, they have, by their example and instruction, done much good to others. They have afforded a fair illustration of the advantages of book farming, when combined with intelligent practice.

Were this example extended to the farming

community of our country, how greatly the work of improvement would advance, and the comforts of the human family be multiplied: were each to contribute his mite of practical knowledge, in the branch in which he most excels, what a treasure of information would be collected, to guide us in our practice, and to stimulate us to habits of industry. And do we not already possess, in a considerable degree, these precious advantages? What are our agricultural journals, but a record of instructions, by the best farmers of our own and every other country—a detail of the methods by which they have succeeded—have excelled—in the various departments of husbandry? There is not a man in the community who may not profit, in some degree, by the teachings of these journals. The self-wise are ever the most profoundly ignorant; for as we advance in knowledge, we become more and more humbled by the consciousness of our comparative ignorance.

We beg that the readers of the Cultivator will take this matter into serious consideration, and remember, that an obligation rests upon them individually, to requite the favors which they are monthly receiving from others, by communicating whatever of their practice that may promise to be beneficial to their brother farmers.

From the Cultivator.

GRAIN WORM.

We promised to insert the memorial of the State Agricultural Society to the legislature in this number; but as we understand that the committee to whom it was referred, deem it not worth reporting upon, we shall content ourselves with stating its purport. The journals of the day noticed it as being an application *for aid*. The fact is not so. The memorial states, that the ravages of the grain worm have become alarming; that in some of the northern and eastern countries, the loss incident to their destruction of the wheat crop has already exceeded, by computation, two hundred thousand dollars; that it is progressing south and west, at the rate of 40 to 60 miles a year; and that unless some means are devised to check the evil, it threatens to become destructive to the great staple of the west. Viewing the magnitude of the evil, and the prospect of its greatly increasing, the society thought it might comport with the duty and the dignity of the legislature, who are appointed to watch over the interests of the state, to endeavor to arrest it, by holding out pecuniary rewards for the discovery of an efficient remedy. This, they supposed, would tend to call the attention of scientific as well as practical men, particularly to the subject, and might eventuate in the discovery of a preventive of the evil—in which case the state would be benefited a thousand times the value of the premium to be paid—and if no such discovery should be made, then the money would remain in the treasury. There are men, who still believe it is impious to raise rods to avert the lightning from our buildings. The money which is often spent in a day's useless debate, at the shrine of personal vanity, if offered to check this evil, *might* save the state many millions of dollars—and could not possibly do any harm.

From the American Journal of Science and Arts.

A LIVE SNAKE SUSPENDED BY SPIDERS.

Batavia, N. Y., Sept. 30, 1835.

Sir—In the "Spirit of the Times" of this village, of the date of Aug. 26, 1834, I published over the signature of "A Witness" an account of a *snake* found suspended by spiders' web, by the tail, in the wine cellar of a gentleman in this village.

A gentleman who also saw and examined the phenomenon, promised to send you a drawing and account of it. Whether he has done so or not, I do not know. And as the story has been treated as a fable by some of the papers, I send you enclosed the account above mentioned, and a correct drawing, (though rough and done in haste,) made by James Milnor, Jr. Esq., a clerk in the Holland Company Land Office.

The gentleman in whose wine cellar the snake was found, is the Hon. David E. Evans, agent of the Holland Land Company, who requests me to forward to you the drawing and account, which he pronounces to be accurate.

Mr. Evans, Mr. Milnor, Mr. Mix, Dr. Van Tuyl, and a great number of other gentlemen, examined this subject critically on several different days, while the snake was yet alive, and all concur in the accuracy of the account.

I hope you will procure a correct engraved cut of the drawing, and publish it with the account in your journal. And if you do, you are at liberty to use all the names mentioned in this letter, or to publish it at length, if you think proper.

Most respectfully, your obedient servant,

S. CUMMINGS.*

The following is the account alluded to in the above letter:

On the evening of the 13th inst., a gentleman in this village found in his wine cellar a *live striped snake*, nine inches long, suspended between two shelves, by the tail, by spiders' web. The snake hung so that his head could not reach the shelf below him, by about an inch; and several large spiders were then upon him, sucking his juices. The shelves were about two feet apart; and the lower one was just below the bottom of a cellar window, through which the snake probably passed into it. From the shelf above it, there was a web in the shape of an inverted cone, eight or ten inches in diameter at the top, and concentrated to a focus, about six or eight inches from the under side of this shelf. From this focus, there was a strong cord made of the multiplied threads of the spiders' web, apparently as large as common sewing silk; and by this cord the snake was suspended.

Upon a critical examination through a magnifying glass, the following curious facts appeared. The mouth of the snake was fast tied up, by a great number of threads, wound around it, so tight that he could not run out his tongue. His tail was tied in a knot, so as to leave a small loop, or ring, through which the cord was fastened; and the end of the tail, above this loop, to the length of some-

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* We understand that Mr. Cummings is first Judge of the Court of Common Pleas in this county, and also Postmaster of Batavia.

thing over half an inch, was lashed fast to the cord, to keep it from slipping. As the snake hung, the length of the cord, from his tail, to the focus to which it was fastened, was about six inches; and a little above the tail, there was observed a round ball, about the size of a pea. Upon inspection, this appeared to be a green fly, around which the cord had been wound as the windlass, with which the snake had been hauled up; and a great number of threads were fastened to the cord above, and to the rolling side of this ball to keep it from unwinding, and letting the snake down. The cord, therefore, must have been extended from the focus of the web, to the shelf below, where the snake was lying when first captured; and being made fast to the loop in his tail, the fly was carried and fastened about midway, to the side of the cord. And then, by rolling this fly over and over, it wound the cord around it, both from above and below, until the snake was raised to the proper height, and then was fastened, as before mentioned.

In this situation the suffering snake hung, alive, and furnished a continued feast for several large spiders, until Saturday forenoon, the 16th, when some persons, by playing with him, broke the web above the focus, so as to let part of his body rest upon the shelf below. In this situation he lingered; the spiders taking no notice of him, until Thursday last, eight days after he was discovered; when some large ants were found devouring his dead body.

A WITNESS.

Extracts from the last No. of the British Farmer's Magazine.

SUCCESSFUL STOCK MANAGEMENT, BY SMALL FARMERS.

Moses Greer, of Corlust, was entitled to the first premium, for best stock, fed upon the smallest quantity of land. It appeared that he had fed his stock of four cows and two calves upon the astonishing small quantity of one acre and two roods of land all summer—being about one rood and four perches for each cow, after allowing for the calves and had three roods of turnips and one of rape for winter.

Moses Greer being called on to give an account of his farming, said: "My lords and gentlemen, I hold eight acres and three roods of land, which I have now got into the highest condition, and I shall in future be able to keep it so without going to the expense in lime which I have heretofore been at, by reason of the great quantity of manure I make from my increased stock of cattle, consisting of four cows and two calves; and it will surprise you to hear, *that this stock has been fed this last summer, and up to the present time, on clover and vetches, upon the identical same piece of ground which, when formerly in grazing, fed only one cow, and that very poorly.* My land is held partly at 23s., and part at 8s. 3d. per acre; and my rent amounts to £7 14s. 6d. yearly; and I have already sold butter to the amount of £11 4s., clear of all deductions, and have had enough of milk and butter for myself and my family besides. The abundance of manure has enabled me to set as many potatoes as my neighbors, holding the same quantity of land, and I have as much crop too, besides having my turnips likewise. In conclusion, I am satisfied there is no way in which land can be made to produce so much, or in which it can be brought into such heart, as by the soiling system and four-course rotation of crops, from which I expect every year to derive greater advantages; as I may say, I am only just now beginning to feel the benefit arising from it; my land being now all perfectly clean, and not any of it whatever in pasture."

James Rolsten, being next called on, said, "I am likewise an advocate for green feeding; I had more clover than fed all the stock I had although I had more than doubled it; and I was enabled to save three five-fathom cocks of hay, which will leave me all my straw for manure. After cutting my early vetches, I sowed the ground ridge by ridge as I cut it, with rape, which I am now cutting a yard long and giving to my cattle, so that I shall not have to begin to use my turnips for some time; and it will be again fit to cut in April next, when the turnips begin to fail. I have also levelled every useless ditch; and my land, so far from being exhausted by the four-course rotation, is every year becoming better."

Mr. Ingram said, "I am still of the same opinion as I have formerly expressed, of the benefit to be derived by green crops and house-feeding, which I continue to practice. I find I can thereby increase my stock and my crop also, and have manure for my potatoes and turnips; besides, by this means, I find my land improving under the four-course rotation; and though I am paying according to a late valuation, I am still able to say, as I said last year, I shall be able to make my rent from my dairy."

Thomas Bruce said, "when I came into possession of my farm in 1831, there was no more than about half an acre of potato ground; and this in such a dirty bad condition, that it had to be dug over with a grape, in order to clean it before it could be sown with grain and clover seed. The rest of the land was in a miserable exhausted state, not fit to produce any thing; and I was then possessed of but one cow, and had no meat to feed more; that year I sowed a few turnips upon what manure I had to spare, by employing lime compost for my potatoes; and the next spring, between compost and cow-house manure, I was able to set an acre and a half of potatoes, and half an acre of turnips. That year I was able to house-feed, upon the clover and some vetches, two cows, and had plenty for them all winter. Next spring I had so much manure, that with some assistance from lime compost, I was able to set two acres and a rood of potatoes, and three roods of turnips; and having sowed more clover, I was enabled that season to keep three cows and a horse, which stock I still have, with the addition of a calf, and have fed them this season on five roods of clover, two roods of vetches, and one rood of grazing, which being chiefly on a rocky bottom cannot be broke up; and if an acre was allowed for the keep of the horse, and twenty perches for the calf, this would leave only one rood and four perches for the summer feeding of each cow; and this, with one rood of turnips for each during winter, (which would allow, at 34 tons per acre, near 90 lbs. a day for each for seven months,) would only make 84 perches, or little more than half an English acre for the year's keep; and I have a rood of rape as a stolen crop besides, so that I have plenty of food for them; and my land

is improved to such a degree, that there is more than three times the return from it than what it formerly gave, and I shall now be enabled to keep it in heart by the manure made by house-feeding, without any of the expenses for lime which I have been formerly at."

Mr. Bigger stated, that he held about five Irish acres of land; that he formerly kept but one cow, and had barely food for her. He now kept three and an ass; and part of the year a horse; and after all had clover to spare, to consume which he had bought fourteen young pigs, some of which he still had, and was feeding on potatoes; and had besides sold off the same farm £10 worth of wheat.

Extract from the Southern Agriculturist.

RUST IN COTTON.

The cotton crop in this district of country has not averaged more than 100 pounds of clean cotton to the acre. The rust, that extraordinary and increasing evil, has, apparently, taken hold of all of our high lands. I have, for many years, believed, and still believe, that fire, passed over the land, is the best preventive within our reach; never having doubted that a great portion of the injuries to which vegetable life is subject, owes its origin to the insects that, in countless numbers, fill the earth, the air, and the water, I have believed, that in consuming by fire the vegetable matter upon the surface, something, at least, would be done to lessen their multiplication. But some more efficient remedy must be found. Where the lands are low enough, I would cover them with water during the winter. When this is done, however, it must not be done by halves. The water must be kept deep and long upon the lands. I am in a course of experiment, at this time, upon this subject. I have 250 acres of low ground which have been under water since the 1st of January—nor shall I withdraw the water from the land until the 1st of April; after which, I will, as speedily as possible, plant my corn and cotton in the ridges of the previous year—in the hope that the grass seeds will, by this long immersion, be swollen and destroyed, and that even the chrysalis of the cut-worm, (the great enemy to cotton and corn in low grounds under dry culture) may perish in this long flooding.

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THOMAS SPALDING,

Of Sapello Island, Darien, Georgia.

From the Ohio Farmer.

CULTIVATION OF THE ORANGE, LEMON, &c.

This beautiful family of plants, embracing the orange, lemon, shaddoc, citron, lime and their congiers, is one of the richest ornaments of the green-house. All the varieties are almost as easily raised as the peach-tree, and being sufficiently hardy to withstand a slight freezing, if rightly protected, can be secured, with a little trouble, during the severest winter weather.

1. *Stocks.*

The lemon furnishes the best stocks. Sow the seeds of ripe fruit in crocks, filled with a compost of new earth, from under rotten logs or stumps, garden mould and decayed cow-dung, each one part, very fine and intimately mixed. These crocks should be plunged to their rims in the earth within a well regulated hot bed, early in the spring, and their contents be regularly watered.

When the young plants are one inch high, they should be thinned out and transplanted, one to a pot, taking care to leave, undisturbed, one of the largest, which is to remain for inoculating, during the present season.

Continue to water the seedlings daily, and after stir the earth about their roots with a knife or spatula. When they are removed from the hot-bed place them in a situation protected from cold, northern winds, and also from a full exposure to the full blaze of the noon-day sun.

2. *Budding.*

There are *two* periods when this can be performed successfully. To wit: During the *first* growth of the stock in the month of June, and the *second* in the month of August. This state can be detected by the absence of the terminal buds on the ends of the limbs and the ease with which the bark separates from the wood.

The buds used for insertion during the *former* period should be taken from the *last* growth of the preceding year, and during the *latter* from the *first* growth of the present season.

Select the roundest and fullest buds, and if possible those that are not armed with a thorn or spine from trees which are abundant bearers.

Make choice of a smooth place, upon the stock, and proceed as in common inoculation, only place the transverse incision below the perpendicular one, so as to resemble the letter T inverted thus ⊥, so that the buds when inserted shall be pushed upwards instead of downwards. It may sometimes be convenient, with small stocks, to remove the dirt about the root, and insert the bud below the surface. Having made the transverse and perpendicular incisions, cut out, immediately below the latter, a semi-circular notch, thus ⊥ for the purpose of facilitating the introduction of the bud between the lips of the bark. Do not attempt to separate the thin film of wood that adheres to the inner surface of the bud. When the bud has been carefully pushed into the perpendicular incision, secure it there with a strip of Russia matting or linn bark that has been long macerated in water: care not to pass it directly over the eye of the bud.

The pots should then be placed entirely out of the reach of the sun, but not underneath the eves of a house or limbs of a tree. Water the plants daily, but use special care not to permit the water to run down the stock, as it would destroy the inoculation.

At the end of two or three weeks the foot stalk of the leaf of the bud will drop, and the stock begin to swell above and below the ligature, which should now be removed or loosened. If it be in the month of June, cut off the stock about three inches above the inserted bud, and in a few days the second growth will commence, and that bud will burst forth with great vigor. If it be in August, delay cutting off the stock until the ensuing spring, unless there is an evident disposition to put

forth, by the bud, which sometimes happens late in the summer.

In one instance the writer of this article had an inocculation six inches high in November, growing on a stock raised from a seed sowed in the month of March of the same year, and in three years it had upon it six large and ripe oranges.

3. *Fruiting.*

As soon as the blow-buds begin to show themselves, the compost should be changed in the tops of the pots, and this should be repeated every six weeks until the fruit is mature. During the whole of this period the trees require extra quantities of water, particularly at the time the young fruit is setting.

If an excess of fruit should form, it should be picked off.

During very cold weather and while the trees are not in active growth, they require much less water.

4. *Protection in Winter.*

They can be protected in a healthy state in almost any tight parlor or setting room, provided they are not exposed too directly to the scorching heat of the fire, and are furnished with a frequent supply of fresh air.

REMARKS ON THE ACTION OF PUTRESCENT MANURES, AND THE OPINIONS OF J. M. G. THEREON.

To the Editor of the Farmers' Register.

New Town, King and Queen County, March 21*st*, 1835.

In the March No. of your periodical is a communication signed J. M. G., containing critical remarks upon an able and learned essay in your January No. signed J. B. I am always happy to see an application made of science to agriculture; and both your correspondents have afforded me much pleasure, amusement and information, by the scientific tenor of their observations. It is to be desired that the facts and the principles of science should more frequently be brought into use, to elucidate and settle disputed points in husbandry. Chemistry has accomplished much, that if applied, would be of great practical utility to the farmer; and I doubt not, as it advances, it is destined to achieve much more that may improve and throw light upon the agricultural art.

In the course of J. M. G's. communication he propounds a theory, and supports it by many plausible *a priori* arguments, for the decision of the long controverted question of the proper mode to apply manures to the soil. This theory I intend to examine with the same freedom, and the same feelings of respect for its able author, that characterize his interesting investigation of some of J. B.'s positions. His hypothesis is contained in the following sentence: "Providence has given her (the earth) the power—a kind of chemical affinity or elective attraction (as I beg leave to call it,) of drawing to herself and uniting with all extraneous substances in contact with her surface, which are susceptible of conversion into the food of plants." Again. "The only thing assumed in the foregoing hypothesis, is, that the earth and the atmosphere having to nourish plants in a different manner and by different means—one being the nurse below—the other above ground, neither can possibly take from the other any thing which itself cannot use for their joint object." The conclusion deduced is, that manures should be applied to the surface. In the first place I would remark, that admitting the existence of this chemical affinity of the earth, it would be exerted to greater advantage were the substances and the earth mingled together—that is, were they turned into the earth; because chemical affinity only acts at insensible distances, and the better the mixture of any two things having a chemical affinity, one for the other, the more rapid and perfect will be their combination. Again: this hypothesis assumes, that totally different substances are furnished by the atmosphere and the earth in the economy of vegetation, and hence, that in the harmony of things, they would not, or could not pilfer from one another. So far from this being the case, the nourishment supplied by each, is, to some extent, the same, only in a different state. Water is imbibed by the roots of plants, and when suspended in the atmosphere it slakes the thirst of the leaves. Carbonic acid gas, oxygen, hydrogen, and nitrogen are all found in the atmosphere, and yet these are the very elements that make up the substances which, when in a state of decomposition and solution, the earth supplies as food for her vegetable offspring. The carbon, which is one of the principal constituents of wood, is made up as well from carbonaceous matter received through the roots as the carbonic acid gas received through the leaves. According to a well established law of chemistry, all bodies are susceptible of three states, the solid, liquid, and aeriform state. By an addition of a sufficient quantity of heat, a solid is converted into a liquid, and a liquid into an aeriform state. Water affords a most familiar illustration of this general truth. We have all seen it in the solid, liquid, and gaseous form. When manure heaps are subjected to violent fermentation, half of their substance often ascends in gas, and is dissipated by the four winds. When stable manure is applied to the surface of the earth, carbonic acid and ammonia are disengaged and "lost" in the atmosphere during the process of decomposition; whereas, if it be covered in the soil, these substances contribute nutriment to the roots of plants. This has been shown conclusively by Sir H. Davy, who introduced a retort containing manure in a state of fermentation among the roots of grass in a border of his garden, and found at the end of a week that the grass was much more luxuriant there, than any where else. It may be, that the gases were not taken up in their aeriform state by the roots, but combined with fluids. Carbonic acid is absorbed by water: and such is the affinity of water for ammonia, that it will combine with 780 times its own bulk.

But your correspondent inquires,—"Would the earth keep gas (which by the way, is as great a physical impossibility as to prevent water from seeking its level) when she could not apply it to the nurture of her children—that application being the natural province of the atmosphere." To be convinced that the earth holds gas, it is only necessary to place a small piece of fullers-earth in a tumbler of water, and as it crumbles to

atoms, the gas may be seen ascending to the surface in bubbles. Such is the extreme tenuity of aeriform substances, that they will penetrate wherever there is the smallest opening. Nature is said to abhor a vacuum, and whatever space is not filled by solids or fluids, that we may expect to find occupied by gas. The interstices of the soil contain it, and that there are interstices, the least observant may be convinced, from the fact, that water is strained through them and descends into the veins of the earth.

Sir H. Davy ascertained by experiment, that the presence of oxygen gas is essential to the germination of seed. We need not doubt then, of its existence in the soil. But I imagine that your correspondent could not have intended to assert, though his language would admit of that construction, that there is no gas in the earth, but that the earth cannot retain any particular species or portion of it for a length of time, or permanently. It would be difficult, if not impossible, to ascertain how much of, and for how long a time, a given portion of gas would be retained by the earth. The changes to which the surface is subject, from the influence of heat and moisture in producing contraction and expansion, render this impracticable. But this can be safely asserted, that some of the gases evolved by decomposition in the soil, are taken up by the earthy constituents, and also by water, which may be present. This much at least is gained, when if decomposition takes place on the surface, the gases set free, are in a few moments mingled with the great mass of atmosphere surrounding the earth.

Again: manure covered three, four or five inches in the soil, suffers less heat than at the surface—and of course, there is less tendency to volatilize. I am also induced to think that the decomposition is more gradual; for, although there is more moisture, there is less of the two other essentials—air and heat.

But my object in this communication is to examine the theory of J. M. G., which, if correct, puts this question forever to rest. As it is a chemical theory, I have tested it by chemical principles. I will not, therefore, go into the general argument in favor of turning in manure. J. B. has done this with great ability. But as there are two arguments which he has barely touched, and has not, I think, given them proper prominence, I will give them here in the language of Sir H. Davy.

"Besides the dissipation of gaseous matter, when fermentation is pushed to the extreme, there is another disadvantage in the loss of heat, which, if excited in the soil, is useful in promoting the germination of seed, and in assisting the plant in the first stage of its growth, when it is most feeble and most liable to disease: and the fermentation of manure in the soil must be particularly favorable to the wheat crop, in preserving a genial temperature beneath the surface late in autumn and during winter."

"Again: it is a general principle in chemistry, that in all cases of decomposition, substances combine much more readily at the moment of their disengagement, than after they have been perfectly formed; and in fermentation beneath the soil, the fluid matter produced is applied instantly, even while it is warm, to the organs of the plant, and consequently, is more likely to be efficient, than in manure that has gone through the process, and of which all the principles have entered into new combinations."

But your correspondent says, that "nature's method we must believe the best," and that she applies "the deciduous parts of trees and smaller plants to the surface." And again he speaks of the "admirable rule," follow nature! Now I would suggest a medical maxim, which is as applicable to vegetable as animal life—"assist nature." It is in obedience to this principle that we cover our seed in the soil, pulverize our lands, cultivate our crops, trim, accelerate and improve the growth of our fruit trees. Were we to follow one of nature's habits, and neglect the rest, which, I humbly conceive, would be the case in exposing our manure on the surface, we might with the same propriety follow another of her habits: scatter our seed to the winds, and depend upon the earth, the air, and the rains to cover, sustain, and mature them. These are nature's agents, by which she executes all her husbandry; she uses not the ploughshare nor the pruning hook. It is the business of the agriculturist to aid nature—and in following nature we should have reference to all her laws—and not follow one of her habits to the exclusion of the rest. She deposites her seed for perpetuating their offspring upon the surface; and by rains, frosts, and animals, units are made to vegetate, for thousands that decay and dissolve into their original elements. She is rich in her stores, but man must husband his resources. She has the interests of the universe to attend to—man his own. It may be, that by the decomposition of vegetable matter upon the surface, the atmosphere is replenished with the gases, of which she has been deprived in the process of vegetation. Whether this be so or not, it is doubtless intended in the economy of nature for some wise purpose. Let not the farmer then, who spreads his enriching stores and invites air and earth to divide for themselves, when he finds that the ærial sister has taken more than conduces to his individual interest, charge her with "grand or petty larceny;" for what is taken from him, she will diffuse through the universe, and return in some other form to her sister. Let him not complain of this as capricious or unjust on the part of the more lofty dame—for "partial evil is universal good."

W. B.

QUERIES ON THE CONSTITUTION OF SOILS.

To the Editor of the Farmers' Register.

In your treatise on calcareous manures, you disclose the remarkable fact, that in the limestone regions of this state, in general, no lime can be detected in the soil, upon an analysis. You suggest, that probably the carbonate has been converted into the oxalate of lime. If this be the case, why is it that the oxalate of lime is not discovered, upon analysis?

In the same essay you give the opinion, that oxalic acid exists in most of our soils in Eastern Virginia. If so, why cannot that be detected, by analysis?

If your engagements will admit of your devoting time enough to answer these queries, you will oblige

A SUBSCRIBER.

[The positions referred to above, are not precisely as there stated. It is not asserted that the limestone soils of Virginia generally contain no *lime*, but that they contain none in the form of the *carbonate*, which is most usual, and in which form it would be supposed to be present. Neither is it said that the *oxalic* acid exists in most of the soils of Eastern Virginia—but that some vegetable acid does, which if not the oxalic, is composed of similar ingredients, and may easily by some of nature's operations, be converted to the oxalic acid.

But even with these corrections, we are unable to give any answer to the inquiries, more satifactory than this—that no good chemists have yet applied their labors to investigate these subjects—and but very few have been induced to cast a thought upon them, by the reasoning presented in the work referred to above, the existence of which is scarcely known to men of science. But there have been recent chemical discoveries serving to maintain the doctrine of vegetable acid in soils, information of which has reached this country since the publication of the Essay on Calcareous Manures, and which will be quoted at length in the forthcoming second edition—one of the first copies of which will be sent to our correspondent, as more explanatory than any thing that could be stated separately in this place.

But even with these recent lights, furnished by Berzelius and other chemists, the subject of acid in soils is still involved in much difficulty and obscurity, and needs, and would well repay, the labor of investigation of any who can bring the science and operative skill necessary for the task. That the author of the essay referred to is most desirous that this should be done, and, that his assumptions should be properly and strictly tested, has been stated in every publication on the subject, from the earliest to the last.]

From the Farmer and Gardener.

CORN-STALK FODDER.

In some late numbers of your "Farmer and Gardener," I read with much pleasure a detail of the management of the corn-stalk as a food for cattle, &c. First induced to turn my attention to this subject by the different communications to be found in the "Farmer," for some years back, I began in 1830 to test the value of the refuse of corn, when subjected to the process of steaming. I was not long inventing a strong, rough apparatus for my purpose, which succeeded well, and in which I prepared about twenty bushels at once. Previous to this, I had, however, fallen on a plan of saving my corn and stalks, &c. somewhat different from my neighbors; but in a way that the columns of your valuable paper had been long laboring to persuade the corn planters of the country to try fairly, viz: to cut down the stalks at the ground, at a certain stage of maturity, and at one effort to cure corn, stalks, blades, &c. in the field. I had seen this first practiced on the south branch of the Potomac, as far back as 1812: and about 1817, I determined to try the process in this section of the Union, not being able to discover any solid reason why it should not succeed as well here as on the south branch of the Potomac, or elsewhere; but indeed compelled to believe, from a recollection of the climate I was in, that it must succeed here much better. In 1817, I tried six acres—cut it down at the ground, about a week after the blades were ready for stripping. I found a little shrinkage in the grain, but I felt satisfied, that as my corn was not like Pinder's razor, "made to sell," but to eat, that what was lost by the shrinkage was no part of the nutritive principle; and I did not despair of getting over that difficulty, by further trial, and by improving the mode of proceeding.

The following year I cut down five acres. I began the saving of this field of corn by going through it, as soon as a few of the under blades appeared ready to pull, and gathered and brought them home, throwing them in an old out-house to cure, and which, by a little turning over, I readily effected. I will remark here, that this five acres was a piece of corn on which I was trying the effect of rotten cotton seed as a manure, by planting four stalks in the hill, on light land, at the distance of five feet by four. On this field I had determined also to try the full effect of an economical management, in saving the result of labor bestowed on the earth—"Save all" was my motto, and I literally saved every blade.

Before my corn required a second pulling of blades, I found the shuck on the ear in that state, which authorised, I believed, the next step, and the principal one I had in view, the new mode of saving the balance by one "*coup de main.*" The result of observation and reflection induced this determination, viz: that in the saving process, the mode of stacking the corn-stalks that would permit them to cure the most gradually would certainly admit the least lost by shrinkage from evaporation, &c. To effect this, I selected four strong, careful hands, to cut and lay down, taking eight rows at a through. On getting to the end of the rows, they turned round, and gathered together sixteen hills, each bringing to one who attended the stacking. As each man placed his armful on the ground the butt ends were pressed by him as far into the earth as possible, throwing the tops together, so that when the sixteen hills were brought together at the tops the mass presented a sugar-loaf appearance, spread well at the bottom, to admit the entrance of air—tying at the top with a bandage of crab grass found among the corn, and twisted into a small rope in a few minutes. In this way I cut and stacked my field. On the 10th day I found by an examination of the inside of the stacks, that the whole was cured in a way that I could not have exceeded by any other process, although the weather had been rainy occasionally. I hauled the whole home, and packed it away under open sheds, and in old out houses. In this state it continued, until winter's bleak and stormy weather admonished us that in-door business was to be attended to; when all hands went to stripping "corn and fodder from stalks." In doing this, I observed the following order, viz: each individual threw his ear of corn, as he pulled it off, behind him, and his stalks on one side, laying them down with attention to regularity; and the fodder on the other —as soon as he had an armful of stalks to remove, he rose and placed the stalks in a pile, casting the fodder into another depository. All this precaution, as regarded the stalks was to have them in a

situation that with expedition and convenience they could be placed in the cutting-box, to which they were to be subjected. In one day's work, I had a prodigious pile of stalks thus stripped. The next rainy day I brought in my "Eastman," and a man and a boy soon reduced the pile to pieces, half an inch in length. Here, sir, I would just remark, what a quantity of this labor I got through within a short time, by pursuing every moment systematically, and being prepared for every operation before I commenced it. It will now be readily granted, that I had saved as much of the nutritive qualities of the stalk, shuck, and blade, by my mode of curing, as was possible to effect; and also, that I had prodigiously diminished the labor usually bestowed in the common mode of saving corn and its refuse. At the same time that I was preparing the stalks, I also shucked, so that in cutting up the stalks, I cut, at the same operation, a proportion of shuck with stalk.

But the principal object was yet to begin, viz: to prepare these cut stalks and shucks in such a way as would render them the most nutritious and palatable food for cattle. To effect this, I proceeded thus: I placed three strong hogsheads, made of cedar, well pitched, on the outside, on a platform, about three feet from the ground, having at the bottom a large spigot to let off their contents. Just before these, I had a large trough placed, at the distance of twenty feet, and well enclosed along with the hogsheads. Between the hogsheads and the troughs, I had the steam apparatus placed, all under a shed. Into these hogsheads I threw a small quantity of boiling water, and into the water a portion of corn meal, (coarse ground) just sufficient, when the cask was filled, to produce the vinous fermentation, as if going to distil; with a good straw mat top, for each cask. After an hour, and well stirring, I filled up with cold, soft water, and left the mass to ferment. As soon as my liquid was ready, or just as the acetous fermentation was about to commence, I worked off in my steaming-box a turn of the stalks and shucks, mixed up, and as soon as sufficiently steamed, I placed a quantity in my trough, pressing them well down, with a false top, moveable as I wanted, and now drawing the spigot from the cask ready, the liquid was permitted to cover them, running along a portable, light trough, such as distillers use for conveying water. This I did in the evening, and by morning I took up in light buckets the quantity required for the mornings feeding of my oxen and cows, &c. placing it in the feeding troughs, stepping only a few feet, sprinkling a little salt over the mass. The cut stalks and shucks had become perfectly charged by absorption with liquid, at once one of the most palatable and nutritious preparations yet discovered—of this food I gave them plenty. The effect on the flesh and milk, exceeded my most sanguine expectations. My cattle became excessively fond of it, and I so fed as to "lose nothing."

My casks by a little management, I had always "under way," one always ready. I now ascertained to my full satisfaction, that I could not bestow too much trouble, (as it is called,) in saving my corn stalks!

Satisfied of the value of my labor, I have since added to the steam-box all refuse potatoes, turnips, cabbage leaves, beets, parsnips, carrots and pumpkins, squashes, cucumbers, &c.; in fine all the vegetable productions of the field, orchard or garden, as the season may afford, "that nothing may be lost"—and I find that I am well paid for the labor bestowed. The last, after absorbing what they will contain of the liquid, goes to the support of "old Ned."

AGRICOLA.

From the Rail Road Journal.

UNDULATING RAILWAYS.

Washington, D, C. March 30, 1835.

Messrs. Badnall and Stephenson, in their views respecting undulating rail roads, are both right and both wrong. Mr. Badnall's experiments prove, that in locating rail roads in this country, where they must necessarily be undulating, an effect of power may be had not differing materially from the effect had upon level rail roads; and it becomes the duty of engineers, to whom this subject more particularly belongs, to give *particular* attention to it. Mr. Stephenson's views are correct in favor of level rail roads; but it is out of the question to have them level for any considerable length in this country, or any other. We must then consider the results of Mr. Badnall's experiments as highly useful and important, inasmuch as they demonstrate that the useful effect upon a rail road over an undulating country may be nearly, if not quite equal, to the effect if the road were level. I belong to the craft whose duty it is to make these subjects their study, and if you do not greet me too roughly, may remind you occasionally of

Most respectfully, your

FRIEND.

PORTABLE RAILWAY.

A novel machine was a few days ago exhibited in the Kennington and Clapham roads. It consisted of a sort of carriage-wheel which carries a rail road for itself, upon which the carriage travels with great facility and quickness. It was composed of a jointed square instead of a circle, and has four rollers, not touching the road, and four feet which alternately come to the ground, producing a kind of walking and escaping obstacles. We understand it is the invention of Lewis Gompertz, Esq. Should these machines be adopted, probably common rail roads may be partially or wholly dispensed with.

Translated for the Farmers' Register, from the *Traite de Chimie*, the French version of the work of Berzelius.*

DESTRUCTION OF VEGETABLE MATTERS BY FERMENTATION.

If vegetable substances are exposed to the influence of the air, and at the same time taking care that they do not lose the water which they contain naturally, or that they do not become dry, they begin to be decomposed gradually; and this destruction, which may be called spontaneous, has received the name of *fermentation*. This decom-

*Part of the following extracts, relating to geine and geic acid, have been also used in the Appendix to the Essay on Calcareous Manures.

position presents many stages. Bodies which contain sugar, furnish at first alcohol and carbonic acid, and this stage of fermentation has been called the *vinous*, or *alcoholic.* They afterwards become acid, produce acetic acid, which state constitutes what is called the *acetous* fermentation. Finally, the greater part of vegetable substances are changed slowly into mould, (humus) and thus undergo the fermentation called *putrid.* There are but few vegetable matters which can pass through these three stages; a greater number commence with the second, and a still more numerous class are susceptible of undergoing only the third, that is to say, of entering into putrefaction.

[The next positions of the work, which treat at length of vinous and acetous fermentation, are passed over.]

Putrefaction.

The last kind of fermentation, or spontaneous alteration of vegetable matters, has been termed putrefaction. The phenomena which it presents, and the products which result from it, are much more varied than those of the preceding fermentations; but they have been much less examined, and in consequence, are less known. The powerful vegetable acids, the vegetable alkalis, the resins, the fixed and the volatile oils, do not pass into putrefaction: on the contrary, bodies which, besides carbon, hydrogen, and oxygen, contain nitrogen and sulphur, putrefy easily. By drying, putrefaction is prevented; and although solid and insoluble bodies may be gradually destroyed in the air, that does not happen when they are completely secured from moisture. Bodies the most putrescent, such as vegetable albumen and gluten, are preserved for an indefinite time, after having been dried. Thus a body enters into fermentation only as it is filled with moisture. But the presence of water is not sufficient: without oxygen, putrefaction does not take place, or it is so slow that it appears to be stopped. It is upon this circumstance that is founded the method of Appert, of preserving vegetable matters for a long time. For example, Appert fills completely a glass bottle with fresh green peas, closes it hermetically, ties and seals with pitch the stopper, and then places the bottle in a pot of water, which he heats to the boiling point. While thus heated, the peas absorb the oxygen of the air contained in the bottle, which is not replaced by the oxygen of the exterior air. The peas are thus preserved without alteration through a whole year. But if the stopper is not perfectly close, air penetrates into the bottle, is renewed, and quickly causes the putrefaction of the peas, which spread a tainted odor. By the same means, both animal and vegetable matters may be preserved. It suffices for that, to place them in vessels closely stopped, and to heat them slowly to 100°, [Centigrade.] The oxygen of the air contained in the vessels, is absorbed in consequence of an action which is the commencement of putrefaction—and the organic matters are then in the midst of an atmosphere of nitrogen gas, and of newly produced carbonic acid gas. Thus air and water are necessary to the production of rapid fermentation; however, their influence is not exerted but with the aid of heat; for under 0°, the temperature at which water freezes, organic matters do not undergo any alteration. It has been seen that antediluvian animals which had been enclosed in mountains of ice, when exposed finally by thawing, had not undergone putrefaction, although they had remained at least 6000 years in the ice. Organic matters are preserved sufficiently well even at some degrees above 0°; but from 6° to 7°, the phenomena of decomposition begin to show, after some time; from 15° to 18° putrefaction is established promptly, and from 20° to 30° it proceeds with great rapidity. When putrefaction is once fully established, it extends very fast, which may induce the belief, that the products which result from it, have the property of exciting a reaction similar to that which caused their formation.

Organic bodies which rot in open air, absorb oxygen; but they rarely retain it; for ordinarily they disengage a volume of carbonic acid gas equal to that of the oxygen absorbed. When the air does not touch all the points of the bodies which rot, the surface of these bodies present phenomena different from the interior of the mass. At the places where the air is in full contact with the organic matter, every thing is oxygenated, so that the carbon is converted to carbonic acid, the hydrogen to water, and the nitrogen to nitric acid. But when oxygen is not, or is but slightly in contact with the rotting organic matter, the hydrogen combines with the other elements, that is to say, with the carbon, the nitrogen, the sulphur, and the phosphorus. It might be even, that one part of the hydrogen should be furnished by the decomposition of the water. It is the mixture of these combinations of hydrogen, and their being thrown off into the air, which causes putrefying matters to spread such an offensive odor. Vegetable matters, which contain only carbon, hydrogen, and oxygen, are decomposed without producing a very disagreeable odor; but matters which contain nitrogen, smell strongly, and when a little sulphur or phosphorus is also contained, the odor of the putrefying body becomes insupportable. As yet, no chemist has set to work to determine with any precision, what are the chemical changes which accompany putrefaction, and what are the properties of the resulting products.

If moist vegetable matters are put in a heap, there takes place, especially in hot weather, a reaction between their elements, in consequence of which the temperature is raised; water is disengaged under the form of a thick vapor, and the mass finally becomes heated to that degree that it takes fire and burns. The commencement of this reaction, and its progress to the point of ignition, is certainly a species of putrefaction; but we are ignorant what are the chemical changes which accompany it, and which make progress rapid enough to cause the mass to be heated to so high a degree. It is the same chemical action to which hay is often subject, when it is put into stacks before having been sufficiently cured; it is heated, exhales a peculiar odor, and would not be long without taking fire, if not opened and dried.

Organic matters when covered with water rot also, but in so doing, they present other phenomena than when they rot in the air. Very often the reaction commences by the production of microscopic animalcules, living and possessing powers of motion, which have received the name of *infusory animals.* At the beginning of putrefac-

tion, many generations of these animals succeed each other, die and disappear, whilst their elementary parts concur with, and aid the phenomena of putrefaction. The water acts by dissolving the soluble parts of organic matters, which are destroyed at the surface of the water by the action of the air, and which absorb the oxygen which the air yields to the water. In this manner, the insoluble parts are at first preserved from destruction, which cannot take place without the help of the air; but by degrees the dissolved bodies are decomposed, oxygen penetrates into the water, and the destruction spreads over the insoluble parts. But this reaction operates very slowly, and bodies amassed at the bottom of water so that the air cannot penetrate to them, can resist so well during thousands of years, that their origin may after that time be still recognized.

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Putrefaction at the surface of the earth—Mould.

The vegetable matters which rot at the surface of the earth, finish by leaving a blackish brown pulverulent mass, which has received the name of *mould*, [humus.]

All the vegetation of a year, which dies at the arrival of winter, is converted by degrees to mould, which is mixed with the earth in which the plant grew: whence it comes that the extreme surface of the earth contains a greater or less proportion of mould, which serves for the nutriment of the succeeding growth of plants. This mould, such as it is found in the earth, is often mingled with the products of a less advanced putrefaction, or even with vegetable parts not changed, principally, a great quantity of small roots. If we examine the mould, such as it is found in cultivated soils, it is found to be in a mass very much mixed; but it is always possible to extract the parts which characterize mould.

During the transformation of the vegetable matters to mould, the first portion of their mass is changed into a brownish black substance, which presents all the characters of *apotheme*,* when we have separated from it the unaltered *extract*, which the apotheme draws with it. The salts of such acids as are of organic origin, contained in the vegetable matter, are destroyed, so that the elements of the acid are resolved into water and carbonic acid, whilst the base is combined with the substance analogous to apotheme, which makes part of the mould. The salts of acids of mineral origin are preserved, unless they are soluble, in which case the rain carries them off. In addition, mould contains a substance but slightly soluble in water, which colors the liquid yellow, and a carbonaceous substance which is entirely insoluble, and which appears to be one of the products of a destruction, still more advanced, of organic matters.

To give an example of a completed formation of a mould of vegetable origin, I shall here state the results of an analysis to which Bracannot submitted some wheat, which had remained during many centuries in a damp vault, the issues from which were stopped up by earth, and of which the existence was forgotten, until by chance it was again discovered. The grains had preserved their form, and the brightness of their outside skin; but they were black, and were reduced by the slightest pressure to a black powder. The water with which they were boiled was colored yellow, and it left, after being evaporated, a saline mass of a brownish yellow, which burnt with slight explosion when heated, and which, besides the substance cited, soluble in water, contained nitrate of potash, nitrate of lime, and a little of the muriates of potash and of lime. The nitrates were the result of the oxydation of the nitrogen contained in the gluten and vegetable albumen, and of the combination of the nitric acid thus produced, with the bases previously combined with vegetable acids. The weight of this mass soluble in water, including the salts and all the other principles, did not exceed 1½ per cent. of the weight of the black grain. When the part insoluble in water was boiled in alcohol, a small trace of a brown substance was taken up, which remained after evaporating the alcohol, and had the consistence of wax. The mass, exhausted of its soluble parts by boiling water and alcohol, was then heated slowly with a weak solution of caustic potash, which became saturated and colored of a blackish brown; and this treatment was continued as long as new potash lie took up any thing. This substance was precipitated from the solution by an acid: it was the body similar to *apotheme* which has already been mentioned, and of which the weight amounted to 26½ per cent. The portion of matter insoluble in the alkali preserved the same appearance. This exposed to the action of diluted muriatic acid, yielded to it a certain quantity of lime, of oxide of iron, and of phosphate of lime. The residue was again acted on by potash, which took up a new and very large proportion of the body similar to *apotheme*. This was, after that, combined with lime, and resisted in that state the action of potash. This calcareous combination amounted to 42 hundredths. The 30 per cent. remaining consisted of a black carbonaceous matter, insoluble in the solvent used.

If cultivated soil is treated in the same manner, similar results will be obtained, with this difference, that the earthy matter of the soil is found mixed with the products which are obtained, whilst no soluble salts are met with, they being generally carried off by the rains.

To describe the constituent principles of mould, it is necessary to designate them by particular names. I will then call *extract of mould* the body soluble in water, and I will give the name of *geine** to the matter similar to apotheme, which constitutes the principal mass of mould. As to the coally substance insoluble in water, alcohol, acids and alkalis, I will designate it by the name of *carbonaceous* mould.

Extract of mould.

We obtain this substance by drawing it from the mould by the action of cold water, which becomes thereby colored yellow, and which leaves after evaporation, a yellow extract of a bitter taste, and from which some geine is separated when it

* What Berzelius calls apotheme, is "a deposite slightly soluble in water, produced in an aqueous solution of vegetable extract during slow evaporation, and containing a larger proportion of carbon, than does an equal weight of extract."—Ed.

*Or *humin*, as termed by other authors.

is again acted on by water. If this solution is left to evaporate spontaneously, in contact with air, it becomes covered with an insoluble pellicle, and when a certain degree of concentration has been reached, the liquor becomes turbid. The solution is precipitated by the salts of tin and of lead: after the precipitation, the liquor is without color. According to Korte, the sulphuretted hydrogen gas precipitates it also. This extractive matter is contained in the water of many springs and streams. The water of the springs of Porla in Westrogotha, contains so great a quantity that it is colored yellow. When the iron contained in this water is oxydized from the air, the extract of mould is precipitated with the oxide of iron, and the water becomes clear.

Geine.

This substance has received different names. Bracannot has given to it the name of *ulmin*, for reasons which I have exhibited and opposed in a former part of this work. Dobereiner and Sprengel gave to it the name of *acid of humus*, because it combines with the earths and alkalis. But for the same reason we might give the name of *acid* to more than the half of all vegetable bodies.

Geine does not exist in vegetable earth only; soot contains it also, and according to Bracannot, it is formed when the saw-dust of wood is exposed to the action of caustic potash. It is almost impossible to obtain geine in a state of purity. One part of the geine which is met with in a natural state, is in combination with bases; but when we attempt to remove these by an acid, the geine combines in part with the excess of acid, and acquires itself (in part) the property of reddening vegetable blues. Geine possesses all the properties of apotheme, and it is produced like other apothemes; that is to say, by the action of the air on dissolved extract of mould. In its natural state it does not act chemically, either like the acids or the alkalis, nor does it have any effect on the color of vegetable blues. It is but slightly soluble in water, which it colors of a pale yellow; is still less soluble in alcohol, and insoluble in ether. Exposed to the action of heat it takes fire, burns at first with flame, then without flame like spunk, spreading a peculiar odor, something like that of burning peat. Submitted to dry distillation, it is decomposed, gives half its weight of a charcoal having a metallic lustre, of empyreumatic oil, an acid water containing acetic acid and sometimes ammonia, some carburetted hydrogen, and a little carbonic acid gas. If geine is held suspended in water, through which a current of chlorine is passed, this whitens it, and precipitates a white resin-like substance. Iodine is without action on it. If we add an acid to an alkaline solution of geine, the geine is precipitated. If the whole of the geine is not precipitated, that part which is precipitated retains in combination a small portion of the base, and leaves, when it is burnt, a small quantity of alkaline ashes. If, on the contrary, an excess of acid is poured into the alkaline solution, the liquor is discolored, and the precipitated geine strongly reddens vegetable blues, a property which cannot be removed by placing the geine on a filter, and pouring water upon it. So long as the liquor which passes through the filter contains free acid, it is not colored; then it begins to be colored, and finally it dissolves as much as two-thirds of its weight of the precipitated mass. These acid properties belong in part to the geine, which owes them to the action of the alkali, and which may, in this case, be called *geic acid;* they ought to be in part attributed to a combination of the geine with the precipitated acid. According to Einhoff, it is the latter case which is really presented, and the acid cannot be carried off, but with the aid of an alkali. Sprengel, on the other hand, pretends to have freed the geine, by prolonged washing, from the muriatic acid which had served to precipitate it: and to make certain the absence of the muriatic acid, he has mixed the washed geine with a little nitrate of silver. After evaporation to dryness, and calcination, the residue, treated by nitric acid, was dissolved, without leaving any muriate of silver. But as muriate of silver, like the other salts of silver, is reduced to a metallic state by bodies containing carbon and hydrogen, and carbon itself effects the same change when disengaged along with water, this result proves nothing. In general, in the descriptions of geine, they have attributed the properties of that which has been changed by the action of an alkali, to the geine which has not been altered. The geine which reddens vegetable blues, is the same, whatever may have been the acid which served for its precipitation. Its saturated aqueous solution is of a yellowish brown, and the combination is precipitated anew by acids, excepting the carbonic, and the sulphuretted hydrogen. Collected upon a filter, it is presented under the form of a gelatinous mass, of a taste slightly acid, astringent—and by drying, it contracts strongly, and forms clots of a deep brown, almost black, with a vitreous fracture, and which are not dissolved again in water after being once completely dried. The aqueous solution of the acid geine, is precipitated by the salts of lead, of tin, and of iron; but is not disturbed by gelatine, albumen, starch, gum, tannin, or solution of soap. According to Bracannot, it is precipitated by a mixture of the solution of gelatine and gallic acid. The dried geine is dissolved with difficulty, and incompletely, in alcohol. The solution reddens vegetable blues, whilst the part not dissolved is without this power, though it still preserves the property of combining with potash. Geine is destroyed by concentrated acids. The sulphuric acid dissolves it, taking at the same time a black color, carbonizing it, disengaging sulphurous acid gas, and leaving for residue the ordinary products which result from the action of this acid. By the addition of sur-oxide (or black oxide) of manganese, carbonic acid gas is disengaged. The nitric acid dissolves and decomposes geine, with a disengagement of nitric oxide gas, and carbonic acid gas. If the solution is evaporated to the consistence of sirop, and then mixed with water, there is precipitated a peculiar bitter substance in powder, and there are found in the solution, artificial tannin and oxalic acid.

Geine forms soluble combinations with alkalis. When an excess of geine is used, the caustic alkalis are so neutralized by this substance, that they lose their peculiar chemical action and properties. In this respect geine agrees with gluten, vegetable albumen, the brown of indigo, the sugar of liquorice, apotheme, and other bodies not acid. During the evaporation, the solution furnishes a black mass, which acquires lustre by complete drying, and splits, and is easily reduced to a powder. It

is re-dissolved in water, its taste is weak, bitter and disagreeable. Caustic ammonia gives a like mass, soluble in water, which gives up, during evaporation, the excess of alkali employed. Geine is not dissolved always in alkaline carbonates; when it is so dissolved, these carbonates are transformed, half into *geates*, half into bi-carbonates. When the solution is boiled, the bi-carbonate is decomposed with disengagement of carbonic acid gas, and in this manner the geine drives off all the carbonic acid. If a solution of geine in carbonate of ammonia, is evaporated, a residue is obtained containing neutralized geate of ammonia. The solution of geine in caustic potash in excess, absorbs oxygen from the air, and at the end of some time, the alkali is in part carbonated.

Geine forms with the *alkaline earths* pulverulent combinations but little soluble, which have an external resemblance to geine. The best means for obtaining them, is to mix a solution of the geate of ammonia, with the solution of an earthy salt; the combination of the geine with the earth is precipitated, and may be separated by filtration, from the supernatant fluid. In the humid state, these compounds are slightly soluble in water. According to the experiments of Sprengel, one part of *geate of barytes* is dissolved in 5200 parts of water, one part of geate of lime is soluble in 2000 parts of water, and one part of geate of magnesia, in 160 parts of water, cold. These same compounds require for their solution, rather smaller proportions of boiling water. After having been completely dried, they will no more dissolve. In the air, the base is combined in part with carbonic acid, and the carbonate which results therefrom, remains in the state of mixture with a combination of geine, and of a base analogous to a super-salt. The alkaline carbonates decompose the earthy geates; they dissolve the geine, and leave the base in the state of carbonate. According to Sprengel, the *geates of lime* and *magnesia* are dissolved in the caustic fixed alkalis, and in the carbonate of ammonia. Other chemists have not arrived at the same result; and according to them, the geate of potash, acted on by the hydrate of lime, precipitates all the geine. The *geate of alumina* is precipitated when a solution of alum is mixed with a solution of geate of potash, or of ammonia. This compound is dissolved in 4200 parts of cold water. In the moist state it is dissolved easily, and in abundance, in the alkaline carbonates and hydrates, and even in ammonia. According to Sprengel, it resists the decomposing action of acids, so that it is difficult to extract from it geine exempt from alumine. A combination is obtained having an excess of alumine, by digesting a solution of the geate of ammonia with hydrate of alumina. *

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Carbonaceous mould.

The substance to which this name has been given has been but little examined. It is insoluble in alkaline liquors. Its color is a brown, almost black. Placed in contact with a body in combustion, it takes fire, and burns without flame like spunk. According to the experiments of Th. de Saussure, carbonaceous mould combines with the oxygen of the air, and forms carbonic acid gas, and when it is left a long time exposed to air and water, it becomes by slow degrees soluble in alkalis. The acids precipitate it from the alkaline solution, in the state of acid geine. When cold, the sulphuric acid has but little effect on it. According to Bracannot, the nitric acid converts it, at a gentle heat, to a brown liquor, in which water produces a precipitate of a chocolate color, which possesses the properties of acid geine, and is dissolved without residue, in the alkalis.

Soil [terre végétale.]

It is the mixture of these several substances with the upper layer of the surface of the earth, which constitutes the *vegetable earth*, or *soil*, properly so called. Arable land is a bed of this soil, placed upon a bed of earth which contains no mould. Its fertility depends upon the quantity of mould which it contains. Growing plants continually diminish the quantity of geine contained in the soil; and when the plants are carried off from the soil on which they grew, which happens almost always with cultivated land, it is finally exhausted to that degree as to produce nothing. It is on this account that it is necessary to manure land. The matters discharged and left by animals, or the barn-yard manure which is used for this purpose, are by degrees converted into geine, and thus replace the matters dissipated by vegetation. Botanists who have directed their attention to vegetable physiology, have remarked that the plants vegetate well enough without geine, until the time arrives for them to commence their sexual functions. But as soon as these are ended, and the fruit begins to be developed, the plants absorb a great quantity of the nutritive principles contained in the soil, and if these are not in the soil, the flower falls without forming any fruit. The experiments to which Th. de Saussure has submitted soil, [terre végétale] appear to demonstrate that the three constituent principles of mould, may be converted the one to the other, under the alternately preponderating influence of air and water. Water converts to the *extract of mould* a part of the insoluble *geine* contained in the soil, and this transformation extends more and more, so that finally the greater part of the geine becomes soluble. In contact with the air, the dissolved matter passes again to the state of geine. The *carbonaceous mould* which changes a part of the air into carbonic acid, is itself changed by air into geine, and into the extract of mould, and it is upon this transformation that appear to depend in part the advantages derived from the tillage of the soil, which is divided by the action of the plough, and exposed to the immediate influence of the air. In this manner all the parts of the soil contribute to nutrition; whilst it is probable that the solution of the extract of mould, that of the geate of lime, and perhaps also that of the geate of alumine, are immediately absorbed by the roots. During a heavy rain, this solution penetrates the interior, and often to very deep beds of the steril earth; but notwithstanding that, it is not lost to vegetable life: for the roots of trees seek it, and bring it back as matter suitable for their nourishment.

Experience has demonstrated that quicklime, and the carbonate of lime, mingled with the soil, favor the vegetation produced thereon. Chemistry has not yet explained, in a satisfactory manner, the power which lime thus exerts; however, it is known that when the soil contains this alkaline earth, or, in its place, ashes only, the mould is

quickly consumed, and vegetation becomes more rich in proportion. It has thence been concluded that lime acts, partly in exciting the plant to greater activity, and partly in rendering more soluble the principles of the soil, which are absorbed by the roots when dissolved in the water which the earth has imbibed. Lime is not then a true [or alimentary] manure. It contributes only to promote and hasten the absorption of the principles which serve to nourish the plant; and that lime may be serviceable, it is necessary to introduce into the soil, improved by lime, materials proper to furnish new quantities of mould. The lime, or the alkali contained in ashes, acts also in hastening the change of organic matters to mould.

It is known by experience, that gypsum also augments the fertility of the earth, especially when leguminous plants are cultivated. It is not probable that this neutral salt acts in the same manner as lime, and we are ignorant of what is its mode of acting.

Soil [*terre végétale*] possesses the property of being able to retain as much as three-fourths of its weight of water without appearing moist, and like charcoal, it condenses atmospheric humidity. It owes this property to the geine which it contains, which is one of the substances which, of all known, absorbs moisture with most energy. Mould [*terreau*] can absorb double its weight of water, without appearing moist; and after being dried, it draws from the air, in less than twenty-four hours, a quantity of water, which may vary according to the humidity of the atmosphere, from 80 to 100 per cent. of its weight. This property depends upon its light and dust-like consistence; and geine, of which the fracture becomes vitreous from its course of chemical treatment, is deprived of this physical property, which is of the utmost importance to vegetable life. For, in consequence of this property, mould retains water in the earth and obstructs its evaporation; and it is probably this water which maintains the extremities of the roots in the state to perform their functions.

It is usual to divide soil into fertile earth, and acid earth.* The first is very common—the second presents itself but rarely. It produces nothing, unless it be mosses: it is in marshy places that it is ordinarily found. It is in general composed in the same manner as fertile earth; but whilst in the latter the geine is united with lime, and perhaps with other bases besides, it is, in the acid earth, combined with acids, which, according to Einhof, are the phosphoric and acetic acids. It is for this reason that it has the property of reddening vegetable blues, and that it gives, by calcination, ashes which contain phosphoric acid. To dry distillation, it yields a great quantity of an acid liquid, containing the acetate of ammonia; and when it is distilled, after having mixed it with water, a liquid product is obtained which reddens vegetable blues, and likewise contains acetate of ammonia. In opposition to Einhof, Sprengel affirms that the acid geine is produced only for the want of bases, and that its acid action proceeds only from the geic acid which it contains, and not from the presence of a foreign acid. De Pontin has made the analysis of an arid* soil taken from the plain of Eckerud in the government of Elfsburg in Sweden, and found that the geine had there combined with the malic, acetic, and phosphoric acids. The dissolving of the soluble principles of the soil in boiling water, left to be deposited, when the hydrate of lime was mixed therein, these acids as well as geine, so that there was found afterwards in the water only traces of the acetate and hydrate of lime. But when a current of carbonic acid gas was made to pass through this precipitate steeped in water, the geine remained, without dissolving, in combination with the carbonate of lime produced, while there was formed a solution slightly yellowish, which left, after evaporation, a residue of calcareous salts. This residue was treated by alcohol, which took up a certain quantity of acetate of lime, and left a salt of lime of a gummy appearance, which was soluble in water, and possessed the properties of the malate of lime. In burning the geate of lime, and taking up the residue by muriatic acid, there was obtained a solution which, when treated by ammonia, gave a small precipitate of phosphate of lime. The greater part of the acid geine was dissolved in the carbonate of ammonia. Hydrate of lime was poured into the solution, which precipitated the geine without leaving in solution a salt of lime. But when after having washed the precipitate, it was calcined, and the residue treated with muriatic acid, there was obtained a solution, which, after the expulsion of the carbonic acid, gave with ammonia an abundant precipitate of the phosphate of lime. These experiments confirm those given by Einhof.

An arid* soil becomes fertile when there is mixed with it lime, or ashes and earth, inasmuch as the soil consists principally of geine. The report of Sprengel, according to which, it [this character of soil] is produced in consequence of the absence of the bases which are found in fertile earth, is certainly true; but it does not follow from that, that it owes its acidity solely to the acid nature of the geine. The ashes of arid* soil always contain a great quantity of silex.

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Products of putrefaction under water.

When fresh vegetable matters, not bruised or their thin texture broken, are plunged under water, they resist putrefaction for a long time. We have examples in stakes buried beneath the water, of

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* It is not a little strange to say it is "*usual* [*dans l'usage*] to divide soils into fertile earth and *acid* earth," when the acid nature of any, has been treated by Berzelius as a new discovery, and of which the truth is not admitted by all of those who had taken the subject into consideration. If this division had indeed been usual, there would have been no want of numerous authorities (whatever might be their value) for the acidity of soil.

*This is still more strange, that so abrupt a transition should be made from *acid*, to *arid* soils—and in such manner as to induce the belief that the change was not owing to the author—but to an error of the press. But though this mistake would be as likely to occur in French as almost any other, (only one letter being different in the words *acide* and *aride*—) still it is difficult to believe that this same error should have been made and left to stand three times in this and the next page, where "arid" soils are named, and are marked * as above. The French translation is said to contain numerous typographical errors. I leave others to decide whether these are among the number or not.

sunken vessels, &c. which have been preserved for ages: also, buildings may be erected, without danger, upon a foundation formed of wooden piles driven deep enough to be covered by water: but these vegetable matters are constantly undergoing changes, and then destruction is only retarded. Every one knows that if, at the commencement of summer, a stick is thrust into the muddy bottom of a pond of stagnant water, bubbles of air are disengaged, and they even rise spontaneously at certain places; if collected, the bubbles are found to consist of carburetted hydrogen gas. They are disengaged from organic bodies placed at the bottom of the water, or mingled with the earth below, which rot slowly, and are transformed to a kind of black vegetable earth, known under the name of mud or slime [*terre limoneuse* ou *limon*.] This earth is smooth and yielding to the touch, and when it is not mixed with foreign bodies, it is black. While drying, it contracts greatly, and almost always possesses the property of producing irritation on the skin, which is thereby covered with little red points; it is by reason of this property that this earth is used in many places to prepare the mud baths, [*limoneux*.] The constituent principles of mud are not sufficiently known, for them to be compared with the vegetable earth, or soil, produced in contact with the air.

Peat is another product of putrefaction under water. In certain marshy grounds, there is produced during summer a vegetation which, when it is ended, rots slowly in the water, and forms a bed of a carbonaceous mass, which augments gradually, so that the marsh becomes filled with a kind of soft mud, at the surface of which new growths of vegetation successively rise, and perish in their turn, and thus increase the deposite, until that at last the reservoir of water is completely filled with peat. In warm climates, where vegetation is abundant, and where, consequently, the mass of peat receives each year a more considerable augmentation, the formation of peat is carried on more rapidly; and in cold countries, on the contrary, this operation is more slow, and ages are necessary to produce an inconsiderable body of peat.* This substance has become very important because of its utility as fuel, and those who dig peat mosses gradually for the purpose of burning the peat, believe that forty years will be sufficient to fill again the empty places; but this expectation is not well founded: for it is in opposition to the observations made with the greatest care.

The constituent principles of peat are different salts accidentally dissolved in the muddy water, among which the sulphates of iron and of lime are often found, besides the peculiar combustible matter which constitutes the principal mass of peat. It is black, sometimes of a blackish brown, and it contains, like mould, much water. By drying, peat contracts strongly, loses its coherence, and becomes very friable. Submitted to dry distillation, it yields (according to Bergsma,) carbonic acid gas, and carburetted hydrogen gas, the weight of which amount to nearly 16 per cent. of that of the peat—25 per cent. of an empyreumatic acid water containing acetic acid, and sometimes ammonia—8 per cent. of oil *pyrogénée*—37 per cent. of carbon, and 12 per cent. of ashes. It has been found that these ashes contain no potash. Placed in contact with a body in combustion, peat burns without flame, like spunk, giving out a disagreeable smoke. It is insoluble in water: often it reddens litmus paper (vegetable blue.) Alkaline hydrates and carbonates dissolve it, commonly without leaving any other residue than the earthy substances which are mingled with it. This dissolving differs essentially from that of geine, in this, that when the alkaline liquor is concentrated, the substance of the peat swells up in it, and is changed to a gelatinous mass, which absorbs all the liquor. When afterwards this mass is mixed with hot water, it is resolved into a brown liquor which becomes gelatinous again, when concentrated by evaporation. This solution is precipitated by mineral acids, and the precipitate contains, in chemical combination, the acid employed: but, according to Brandes and Gruner, it is not precipitated by the acetic acid, even when it is applied in excess. If we evaporate to dryness the alkaline solution neutralized by acetic acid, and the residue is then treated by alcohol, this does not redissolve the acetate of potash, and the mass is no more soluble in water. Before the evaporation of the liquor, the hydrate of lime precipitates from it the substance of the peat; and if, after having burnt the precipitate, it is treated by muriatic acid, and ammonia is added to the solution, a little phosphate of lime is obtained. Einhoff has shown that the acidity of the substance of peat proceeds, the same as that of vegetable earth, as much from the acetic as from the phosphoric acid. Besides this particular substance, many kinds of peat contain some resin and wax, (which may be extracted by means of alcohol,) and vegetable parts not destroyed, which remain when the peat is dissolved in an alkali. The quantity of ashes which remains after the burning of the peat, varies from 8 and 10 per cent. of the weight of the dried peat, to 30 per cent or more. These ashes are composed of silex, oxide of iron, phosphate of lime, alumine, and often sulphate of lime and sub-sulphate of iron.

* The author must be understood to speak of countries warm or cold in comparison with his own, Sweden; for as those terms would be used here, the facts are entirely opposed to the statement. Peat is only produced in those regions which are so cold, that all the growth of a summer cannot rot before it is increased by a second year's supply, and so the cover of peat is formed and keeps growing. In Virginia, there is no such formation, because the average heat of a year is always sufficient to decompose all the waste vegetable products of a year.—Ed. Farm. Reg.

DISCOVERY OF THE VALUE OF GYPSUM AS MANURE, AND INTRODUCTION OF ITS USE.

The first discovery of the utility of gypsum, for agricultural purposes, was made by a laborer, engaged in pounding plaster near Hilbrun, in Germany. He noticed the extra growth of the grass along the route which he at different times traveled, across a meadow: supposing it to be occasioned by the fine plaster dropped from his clothes, he was induced to try an experiment to determine the point; it succeeded beyond his expectation; and others tested its usefulness, until all became satisfied of its nutritious qualities; and thus the use of plaster in Germany, became general, as a manure, wherever it could be obtained.

In the year 1768, Jacob Barge, of Philadelphia, having learned the use of plaster in Germany, obtained some from a manufacturer of burr stones, and scattered it upon a field of clover, which proved perfectly satisfactory: in consequence of which, Messrs. Hocker, Lancaster, Clifford, and David Deshler. all respectable farmers near Philadelphia, used the plaster in various ways, and for different plants, and were all equally well satisfied of its utility. The call for, and application of, the article increased; and hence, the commencement of a regular trade, upon the seaboard, in the transportation of plaster from Nova Scotia, to all the southern ports; which has regularly increased, from that period to the present time; and which has become a business as regular and permanent as any other in the United States.

Extract from the Horticultural Register.

HORTICULTURAL NOTES.

On Acclimating the Chinese Mulberry—Flowers—New fruits recommended for culture.

The acclimation of the Morus multicaulis or Chinese mulberry seems to be a subject that demands the attention of the horticulturist. From the accumulated evidence of planters in the Eastern States and the Middle States north of Long Island Sound, it appears that except upon very dry subsoils, it is liable to severe injury from the cold of our winters. In almost every instance in these limits the ends of the young branches which produce the finest and most succulent leaves are killed, and in many nearly the whole of the current year's wood is destroyed. As silk growers agree in the superiority of this species of *Morus* it is highly desirable that it should become more thoroughly naturalized among us. There are but two successful methods by which plants may be acclimated in general practice among cultivators:—continued reproduction from seed born in the new situation, and the disposition of the plants with regard to aspect.* The latter is generally successful only in the case of herbaceous plants and the smaller shrubs, so that it is to the former method we are to look in the case of a tree of so vigorous a growth as the Chinese mulberry. When we reflect that many of the most delicious fruits now abounding in our gardens were originally natives of the warmer temperatures of the Asiatic continent—the peach and apricot of Persia, and the cherry of Pontus, the climate of which have no season approaching in similitude our frigid winters—we may reasonably hope for like success in a plant derived from China, so many of the vegetable productions of which withstand our season perfectly without protection. The fruits just mentioned have been reproduced to an almost endless extent from the seed, and the same gifts of nature which were once considered garden luxuries in Italy now flourish around the door of almost every farmer as far north as the Canadas. It is highly probable that our want of success in the field culture of the vine (which by comparative temperature should succeed perfectly any where in the Middle or Easten States) may be solved by considering that in this country it has been propagated only by extension of the old plant; i. e. by cuttings and layers of the branches. The numberless varieties of the wine grape in Europe, many of which seem to be alone adapted to the vineyard to which they give celebrity, have been undoubtedly produced from seed. The *Morus multicaulis* bears seed at an early age, and in considerable quantity. It is highly probable therefore that the proper method to be taken to enable it to withstand our climate is to sow the seed ripened in this country successive for several generations of plants. In other words, the seeds of the seedling should be sown for a number of years and each crop, it is reasonable to suppose, will become more hardy than the former.

Almost every one derives gratification from the delightful fragrance of flowers. In fact many persons who are not admirers of beautiful colors and fine forms have a decided penchant for grateful smells. Such individuals will invest the grounds of the country villa or the garden of the cottage with an endless source of pleasure to themselves if they will take pains to assemble around them in their home situations the most fragrant flowering plants and shrubs. The porch of the cottage and the pillars of the piazza should be enwreathed and clustered round with the fragrant and beautiful honeysuckles. *Lonicera peryclymenum*, the early fragrant, makes its appearance early in the spring and the monthly fragrant variety of the same plant continues to produce its delicious flowers during the whole season. A more recently introduced variety, *L. flexuosa*, the Chinese twining honeysuckle, also bears very fragrant and beautiful striped flowers, and retains most of its deep green foliage during the dreary months of winter. The taller growing varieties of the China rose—the Champney's and Noisette clusters, may also from their climbing habits and luxuriant growth, be easily trained in any such situation, and a slight protection will suffice to shelter them from the severity of our winters. The quantity of beautiful and fragrant flowers which will produce in a rich soil from June to November is astonishing. We have counted upwards of five hundred roses in bloom and in bud upon a single plant at one time.

But the most charming climbing plant with which we are acquainted is the *Clematis flammula*, or European Sweet Scented Virgin's Bower. It will in good situations reach the height of six or eight feet, and when in full blow in the month of August it literally fills the air with its delicious perfume. Among the first hardy plants which delight us by their pleasant odor in the spring are the Mezereum (*Daphne mezereum*) covered while yet leafless with delicate pink blossoms, and the fragrant European white and blue violets, which

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*In the Farmer's Register for Dec., we presented a statement derived from the *Annales de l'Agriculture Francaise*, showing that it has been ascertained by experiments near Venice, that the Chinese mulberry (Morus multicaulis) cannot be continued by its seed, as it is a variety, produced as new kinds of apples and other fruits are by sowing, and that its seed will produce other varieties. The same kind must therefore be reproduced by cuttings, which fortunately grow well. Our translation of this notice has apparently not been seen by the intelligent writer of the piece above, though it was copied into many of the papers of the United States.—Ed. Farm. Reg.

are the violets of the poets; for though our woods abound in wild species, none of them unfortunately have any fragrance. It is the former that is so beautifully spoken of by Shakspeare, in the passage,

——"The sweet south
That breathes upon a bank of violets,
Stealing and giving odor."

The Lilly of the Valley and the Hyacinth are well known plants, deservedly favorites for their purity and fragrance. The White Lilly (*L. candidum*) still more popular, and the poet's *Narcissus*, the *Monarda*, with its mint-like smell, and the Rose-scented Chinese Pæonia (*P. fragrans,*) together with the above, make a charming *bouquet* of sweets which it should be in the power of every one to gather who has a rood of ground to cultivate. Nor should the Evening Primrose (*Œnothera*) though the common, which disperses its balmy fragrance only in the evening, and the inconspicuous yet delicious *Mignonette*, be forgotten. The sweet scented shrub (*Calycanthus florida*) similar in odor to the pine-apple—the *Magnolia glauca*, the spicy smelling Clethra, the Syringa, and the fragrant yellow blossoming Currant of Missouri (*Ribes aureum,*) all native shrubs of our own continent, have been long appreciated abroad for their elegant and odoriferous flowers. None of the above plants are rare; on the contrary they may all be easily procured, and the increase and dissemination of them around our houses of every description would tend to make the city residence more agreeable and the air of the country still more refreshing and delightful.

There are many fine fruits neglected or but little cultivated in this country, which are highly deserving of the notice of the horticulturist. The English Walnut, or as we term it, Maderia nut (*Juglans regia,*) the fruit of which is annually imported and offered for sale in the shops, will thrive and bear abundant crops when in a genial situation south of 43° of latitude.* The fine appearance of the tree, added to its claims as an excellent fruit when ripe for the table, and in a green state for pickling, ought to recommend it universally to a place in the orchard or ornamental plantation. The Spanish chestnut, with fruit four times the size of our wild species, and the new varieties of filbert, bearing abundant crops of delicious fruit, only need to be better known to be sought after with avidity, as they (particularly the latter) thrive in our climate with very trifling care. The Black European Mulberry (*Morus nigra*) also grows well in a warm situation, and bears fruit of double the size and finer in flavor than the American.

In many situations in the Eastern States the common cranberry is produced in such profusion as to supply the wants of all the neighboring inhabitants; but in the other states and districts, less abounding with marshy and swampy land, its berries, so much esteemed for tarts, &c. are so rarely found growing wild as to be an article of luxury. In such situations it may be gratifying to some cultivators to know that they may be raised in the greatest abundance in any situation tolerably marshy and wet, or where a moderate supply of water may be commanded. A few stakes should be driven in at the intended width of the bed to be made. Inside of these place some boards to hold the soil. Throw in to fill the bottom some small stones, and upon the top of them eight or ten inches of black bog earth, so that the lower three or four inches are immersed in the surrounding water. In this bed a few plants should be set, which will, in the same manner as the strawberry, soon cover the whole surface. The crops obtained will be both abundant and regular, and a small area will supply a large family.

A. J. DOWNING.

Botanic Garden and Nursery, Newburgh, near New-York.

*A tree growing here which bears excellent fruit, now twenty years old, measures three feet in circumference at two feet from the ground.

[The following article which presents facts apparently opposed to the opinion that the Chinese Mulberry cannot be propagated by seeds, was received after the foregoing was in type.]

From the Genesee Farmer.

THE CHINESE MULBERRY.
(Morus multicaulis.)

We have received a number of letters from our distant friends, inquiring for *seeds* of the Chinese Mulberry; and we state in reply that we are not aware that any are, or have been, for sale in this country. The difficulty of procuring these seeds from China, is mentioned in an article which may be found in the 43rd page of our current volume, copied from the Northampton Courier. It appears however, that some were obtained through the aid of an American missionary at Canton; and that the experiments of last summer in Massachusetts have fully proved that the leaves of these seedlings are as large, and the plants as vigorous and thrifty as those raised from cuttings or layers of the Chinese Mulberry.

This result is very satisfactory. In France, *seeds bearing that name*, said to be also from China, were sowed; but they produced other kinds, and it was therefore hastily inferred that *M. multicaulis* was not a distinct species. The seeds were evidently spurious. An editorial article in the last volume of the American Farmer says, "The writ of this, has gathered ripe fruit from a tree only thirteen months old; and has at this time a tree growing from seed ripened at that time." This is the only instance that has come to our knowledge of the Chinese Mulberry having produced good seed in the United States. We have a tree however, about eight feet high, which we intend to prune this spring with a special view to its producing seed.

But we would not intimate that this mode of propagating the tree will be preferable to layers or cuttings, except where we want to transmit the means of cultivating it, to distant places. It is very doubtful if seed will be of much account under any other circumstances. *Gideon B. Smith*, for many years editor of the American Farmer, says "This mulberry bears no fruit, or rather it is so minute, and so small in quantity, that the propagation of it from seed is seldom practised. But like all other vegetables of difficult propagation by seed, it is remarkably easy of reproduction by other means. By laying down the young trees, covering them with earth, and leaving the ends of

the branches out, every branch will take root, and become a young tree—so that every tree one year old, will by proper management, produce from ten to twenty in one summer."

Last spring we set many cuttings, and though both the ground and the season were rather unfavorable, yet about one-half of them rooted; and one attained the height of three feet. We hope to be able in the coming season to give a better account of our operations in this line.

It appears from the American Farmer that "this mulberry was brought from the Philippine Islands by a French corvette, in July 1821. The corvette had been sent out by the French government, under the care of *Samuel Perottet*, for the express purpose of collecting rare plants, seeds, &c. along the coast of Asia as far as the Philippine Islands; and returned laden with them, the *Morus multicaulis* being one of the articles obtained. It was found at the Philippine Islands, whither it had been carried by the Chinese colonists, one of whom remarked that to this plant his country 'owed its immense product of silk.' *M. Perottet* ascertained that it was originally from the north of China; and that it had been transplanted from Canton to Manilla. On its arrival in France, it was immediately taken to the royal gardens at Paris and Montpelier for propagation and experiment, and the result has been its universal adoption so far as it could be obtained."

This mulberry is considered much superior to every other kind. It is said not only "to make silk of the best fibre," but it is also "most congenial to the constitutions of the worms;" and instances have been published of their promptly leaving the white Italian mulberry leaf for this sort. At the Brooklyn nursery indeed, their tastes were tried with six other kinds of mulberry leaves, but the worms gave the new Chinese a decided preference.

It has been repeatedly asserted by those who had the best means of knowing, that one pound of the leaves is nearly or quite equal in value to two pounds of the Italian mulberry, though we have seen a subsequent statement that reduced this difference. It is true that a large succulent leaf of the common kind is inferior in its quality to those of smaller size; but the objection does not apply to the Chinese Mulberry, for though its leaves are very large, they are remarkably thin and silky.

The facility with which the leaves may be gathered, is another inportant consideration. Their great size (often eight inches by ten,*) enables a person to collect an armful in a few minutes; and their low growth is particularly favorable for old people and children who can perform this labor without climbing. From all our observations we conclude that this mulberry has more the habit of a large shrub than a tree; at least it is much inclined to grow bushy; and by cutting it off near the ground, this disposition is much increased. It is doubtless from this circumstance, that it derives its specific name, *multicaulis* or many stalked.

There is one point of great importance however, which remains to be considered. The question is often asked, ***Is this mulberry hardy?*** and we are willing to answer with a slight exception, that it is so in the vicinity of our principal lakes. It is true that the ends of the branches are killed every winter; but ours we think, have not been damaged in this way to a greater extent than ten or twelve inches; and when we consider that the tree continues to grow until it is nipt by the frost, it is just what we ought to expect. Wood that is immature and succulent as a weed, cannot resist a low temperature. All our native trees complete their vegetation in summer, in due time for the wood to harden and the buds to become perfect; but if by planting in a richer soil, we could prolong their growth till late in autumn, the ends of their branches would without doubt perish in the same manner. The poorer the ground, the sooner in the season the tree ceases to grow, and therefore this mulberry will be most likely to withstand the winter best on thin soils.

We consider the losses of these extremities however, as a matter of small account, for it will rarely amount to one-fourth of the growth of one season; and as the trees become older, they will also become hardier. The current of the sap is diminished in velocity by being separated into so many branches; and as it consequently sooner ceases to flow in autumn, the wood has more time to harden.

In mountainous districts where the winters are severe, and where of course, a much greater part of the young shoot is killed by the cold—this mulberry we think, with a little management, may still be cultivated to advantage. The vigor of its vegetation will bear some proportion to the closeness of its pruning; and if most of the branches perish in winter, a luxuriant growth may be expected in summer from the old stool or stump. The leaves however, would come later than where they opened from buds ready formed; but this difficulty may be obviated in three ways: 1. Postpone the hatching of the silk worms by keeping the eggs in an ice-house. 2. Cultivate hardier kinds of mulberry for the spring supply. 3. Dry the leaves of the mulberry in autumn, to be used in the succeeding spring. A correspondent of the National Intelligencer says, "In the month of September Judge Bry of Louisiana, gathered a quantity of the best full grown leaves from the mulberry tree, taking care they should be free from dirt. They were carefully dried in the shade on linen and other cloth; and when perfectly so, were put into sacks, hung in an airy and dry place, until the proper season arrived for hatching the worm. When ready to use them, he pounded the leaves fine, and moistened them with steam—which upon experiment proved to be equally good, if not better nourishment, than the best young leaves."

We would remind our readers that three successive broods of the silk worm may be raised in one season; and that the constant and vigorous vegetation of the Chinese mulberry is admirably adapted to the support of the latter broods.

This mulberry from the great size of its leaves, is very ornamental; and we cannot conclude without strongly recommending to every freeholder who would embellish his door-yard, to procure a tree. The price will not exceed a few shillings.

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*Some leaves have been measured that were 13 inches wide and 15 inches long.

From the Ohio Farmer.

SHEPARDIA, OR BUFFALO BERRY.

This interesting tree was discovered by Mr. Nuttal, in the vicinity of the Rocky Mountains, in the year 1810, and introduced by him into some of the gardens in the Atlantic States. It is perfectly hardy. In Winship's Nursery at Roxbury, in Massachusetts, it flourishes as well as in its native soil and climate, and during the last autumn his trees were literally loaded with fruit, which hangs in racemes of the size and appearance of red currants. The fruit ripens late in the fall. It is sub-acid and palatable in its natural state, and also makes an excellent preserve.

The tree belongs to the Linnæan class "Diœcia," and it is said that it is necessary to place both barren and fertile plants in contiguity, in order, successfully, to raise the fruit—of this however, I have some doubts.

Gentlemen of taste could not expend a few dollars to better advantage in ornamenting their gardens, than by procuring several of those trees.

MISSOURI.

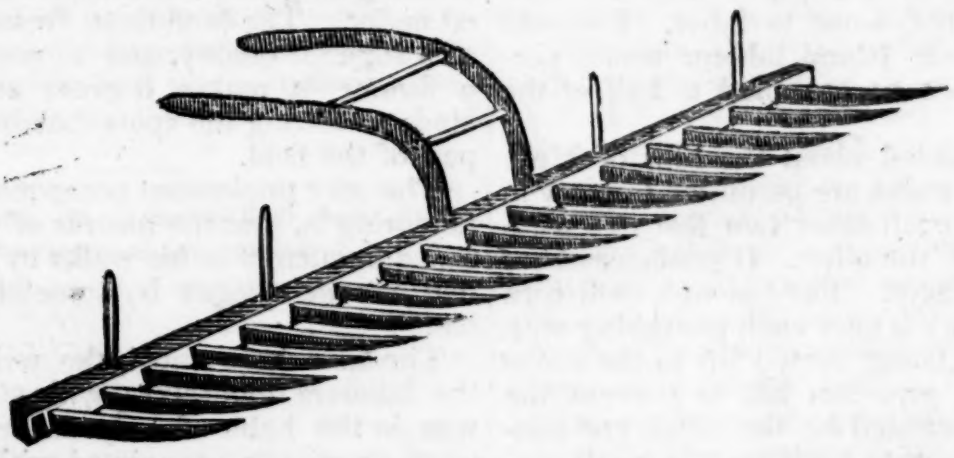
REMARKS ON THE AGRICULTURE OF RHODE ISLAND.

To the Editor of the Farmers' Register.

The following remarks upon the agriculture of Rhode Island, were made during a short visit of pleasure to the delightful summer retreat, Newport. They were made solely for individual gratification, and may be found scarcely worthy of a place in your Register. Observations upon the habits and customs of a community differing essentially from our own, if they lead directly to nothing valuable, have at least a tendency to improvement. They beget a spirit of comparison: we are enabled to see how others execute the same, or nearly the same work, which we have been used to do in a different manner. Improvements are thus carried from one region of country to another with rapidity, which would have been years in finding their way in the gradual advancement of science. Peter the Great of Russia acted under these opinions, when he labored in the ship yards of England.

Our eastern brethren are a great way ahead of us in industry and skill in the labors of the farm. This is caused partly by the climate, which is cool and invigorating during the heats of summer, having by no means the same tendency to relax and enervate the animal system, that is experienced under the warmer sun of a more southern latitude, and partly by early habits of industry.

On the 20th of July, the crop of hay was not entirely secured, and it was said to have been much injured by fogs and wet weather, which had prevailed for some weeks. It accounted to me for the labors of harvest being continued on Sunday. I could not fail to remark the facility with which the grass was collected in wind-rows, by means of a horse rake. I am induced to believe that this rake could be beneficially used in gleaning our wheat fields, where the land is free from stumps and rocks, and where the grain is sowed broad-cast and level. With this impression, I will give a brief description of the implement, and subjoin a drawing of it.



It consists of a beam of sufficient size, say four inches square, and from nine to ten feet in length, into this beam, teeth twenty inches long are morticed, about three inches apart. These teeth are two and a half inches wide where they enter the beam, and curve on the lower side, being at the shoulders flush with the lower side of the beam. In the upper part of the beam, handles are fixed somewhat like those of a plough, except that they bend much more, so as to be conveniently held, as the rake is drawn with the teeth flat upon the ground, and going points foremost. On each side of these handles, which are in the centre, slender upright pieces are fixed in the beam about two feet high to retain the hay in the rake.

It is drawn by a horse, with long rope traces, fastened at each end of the rake, by means of an auger hole through which the rope is passed and knotted. When the rake is filled, it is elevated by the handles and the grass deposited at given spaces, in wind-rows. A boy rides the horse to guide him properly, and another boy sometimes follows with a hand rake to collect small portions of the hay, which may accidentally be left; but where the implement is skilfully used, it gets the grass up perfectly clean.

I should think that one man and a small boy to direct the horse with this rake, would perform the work of ten men with the common hand rake. It is probable that this implement may have been in use in Virginia, but I do not remember to have seen it. I am convinced of its utility in collecting hay, and I should think it useful in gleaning fields of small grain where so much is left on the ground in our slovenly mode of harvesting. Palemon would here have no occasion to direct his laborers to leave something for the "lovely young Lavinia."

I doubt if any portion of Europe can be found more highly cultivated than this island, if we except the immediate vicinity of London, and some part of Tuscany. Every where the earth is made useful. The fields are small, containing from five

to fifteen acres, all rectilinial, and for the most part enclosed by stone walls; sometimes planks and post and rails.

The crops cultivated are grass, corn, potatoes, onions, rye and oats—the largest portion being in grass, the next largest in corn, potatoes, &c. I can give you no better idea of the high cultivation and consequent value of the soil, than by stating the prices of land in rent and in fee.

A gentleman has within a short time, purchased about forty acres of land near the town of Newport, for which he gave five hundred dollars per acre—the buildings upon this land were very ordinary, and could not have been estimated at more than 1500 dollars. The common annual rent of land, from all I could learn, varied from three to ten dollars per acre. Lands adapted to the growth of the onion rented highest, that crop yielding a greater profit to the acre than any other. It will at once be supposed that lands that sell and rent at these prices are not permitted to lie idle: they are all under the plough, or mowed for hay. No fields are seen covered with rank luxuriant and pestilential weeds: the seeds of these plants which so much abound with us, and are even valued as returning vegetable matter to the soil, seem here to be extirpated by cultivation carefully conducted through a series of years.

It surprised me, that under this aspect of the country, I seldom found persons actually laboring in the fields. It seemed as if some friendly fairy did the work by star light. This is to be accounted for, however, by the *energy* with which they work when actually engaged. They do not stop to gaze at you as you pass by, and if you enter their fields and talk to them, they converse with politeness, but do not cease to labor. I should think that one Rhode Island laborer would perform as much work as two and a half of the southern slaves.

Corn is here planted about the 10th of May. From three to five stalks are permitted to grow in a hill, distant from each other two feet one way, and three and a half the other. It produces about fifty bushels to the acre. They plough their corn three times, and work it after each ploughing with the hoes, the earth being drawn up to the stalks very high. They give this hill to prevent the corn from being prostrated by the wind, and consider it more necessary to cultivate this small species of corn with a hill, than the larger southern corn, in consequence of the size of the stalk.

Grass is produced at the rate of from two to three tons to the acre, for which they receive at market from seventy-five cents to one dollar per hundred weight. I was particular in the inquiries I made in relation to the effect produced by the application of marine weeds as manure, which I have observed to be applied on this island, as a top dressing to grass lands. These grasses are probably loosened from the rocks, and the bottom of the sea, by the percussion of the waves; and in particular seasons, when the wind blows in shore, they are collected in large quantities upon the beach, from which they are carefully hauled as manure, and applied to most of their crops with great benefit, particularly to potatoes, corn and grass. Upon the latter they usually put four ox-cart loads to the acre, which are equal to six loads, drawn by our oxen in eastern Virginia. This quantity, when thinly spread, covered the ground, and produced the most beneficial effects. Lands that yielded eight hundred weight of grass to the acre, in an undressed state, would produce as much as two tons if dressed in this way. The grasses used in the greatest quantities, are vulgarly known by the name of *rock weed* and *ribbon grass*. The former is a narrow leafed plant with many joints, at which a number of small roots shoot, resembling very much in appearance our wire grass, which if I mistake not is the fiorin grass of Ireland. The latter is a large and long leaf, not unlike in shape, a corn blade severed in the middle, but very thick, and covered with a fine polish as if it was varnished. It derives its name doubtless, from its resemblance to *ribbon*. This grass may be found in considerable quantities in the rocks on the sea shore, floating in situations where I have fished for the black fish.

The farmers preferred these marine manures to the best stable manure, or the dung of animals—their effects of course being greater. In addition to these marine manures of vegetable basis, they use great quantities of fish called *menhaden*, which are taken in large numbers by fishermen, whose business it is to look out for them on the sea shore. When a shoal of them appears, a boat loaded with the rope of one end of the net, and the seine, goes out beyond the fish, and the fishermen throw out the net, so as to encompass them: another boat attends with the rope, to attach it to the other end of the seine, and thus it is drawn to the shore. These fish are very fat, and seemed to be the same fish known to us, by the name of *ale wife* or *old wife*. They are purchased on the shore at 17 cents a barrel, and applied to the land as a top dressing for grass, and I believe sometimes ploughed under. The land thus dressed produces grass of a superior quality, and to use an expression of a farmer 'it makes it *graze sweet;*' stock of all kinds preferring the spots thus dressed to any other part of the field.

The only unpleasant consequence of this sort of manuring is, that the nostrils of the visiter are assailed frequently in his walks by an odor, to which real *eau de cologne* is, somewhat more agreeable.

The facts here stated, the writer received from the laborers themselves, with many of whom he was in the habit of daily conversation, and who were practically acquainted with every thing appertinent to their vocation. I will here take occasion to remark, that these eastern men, are remarkable for the extent and accuracy of their information in relation to the business, in which they are engaged; all the powers of their minds, sharpened as the intellects are by interest, are brought to concentrate their force upon a single point.

The space I have already occupied, admonishes me to conclude.

"————————In publica commoda peccem,
Si longo sermone morer.————————"

C.

Richmond Co., Feb. 7th, 1835.

From Martin's History of the British Colonies.

STRANGLING HORSES.

Travelling over frozen rivers or lakes is however, not unattended with real danger; the sleigh, its

horses and passengers, being not unfrequently instantly engulfed, and sucked beneath the ice, there being no warning of the danger until the horses sink, dragging the carriole and its inmates after them. In general, it is fortunate the weak or thin places are of no great extent; and when the horses are found to be sinking, the passengers instantly leap out on the strong ice, seize the ropes which, with a running noose, are placed ready for such an emergency on every sleigh-horse's neck, and, by sheer pulling, the animal is *strangled in order to save his life!* This is absolutely a fact. If the horse be allowed to kick and struggle, it only serves to injure and sink him; as soon, however, as the noose is drawn tight, his breathing is momentarily checked, strangulation takes place, the animal becomes motionless, rises to the surface, floats on one side, and is then drawn out on the *strong ice*, when the noose being loosened, respiration recommences, and the horse is on his feet carrioling away again in a few minutes as well as ever. This singular and almost incredible operation has been known to be performed two or three times a day on the same horse; and the Americans say that, like Irishmen, the animals are so used to being hanged that they think nothing about it. Often, however, horses sleigh or carriole, and passengers, are in a moment sunk and swept beneath the ice. The traveller on the frozen rivers, but more especially on the frozen lakes, incurs also great danger from the large cracks or openings which run from one side of the lake to the other, from one to six feet broad, causing, at some distance from the crack, a shelving up of the ice to the height of several feet in proportion to the breadth of the fissure. The sleigh drivers, when they see no other chance of passing or of escape, make the horses endeavor to leap the chink at full gallop, with the sleigh behind them, at the imminent risk of being engulfed in the lake.

INCREASE OF TRANSPORTION ON THE CHARLESTON RAIL ROAD.

The Charleston (S. C.) Patriot of the 4th inst. publishes a corporative view of the receipts of this road for the first three months of the years 1834 and 1835, which presents the following result:

	1834	1835
January,	$4,229	$13,290
February,	8,174	14,875
March,	11,988	17,459
	$24,391	$45,624

Showing that the receipts of the present year are nearly double what they were in the correspondent period of the year 1834. This is exclusive of the amount received for carrying the mails. The same paper further states, that the number of passengers (exclusive of those in the company's service) from the 1st of April 1834 to the 1st of April 1835, has been twenty-nine thousand two hundred and forty eight—and that on the 2d inst. 141 passengers went up in the steam car William Aiken, yielding $607 38.

"This increased business on the road has greatly exceeded the most sanguine expectations of its projectors, and furnishes the best criterion of its prosperity. It has been found so highly beneficial in extending the business of Charleston, that the power on the rail road is at present inadequate for the trade and transportation on it, and the directors have therefore determined to increase it greatly beyond its present amount, by the commencement of the fall business."

ON THE DIFFERENT EFFECTS OF BURNING, AND PLOUGHING IN, ROUGH VEGETABLE MATTER.

To the Editor of the Farmers' Register.

A correspondent in your February No. page 577, very properly comments on the advantage and propriety of every writer for your paper signing his *proper name*, to all communications, stating facts in agriculture. His remarks are sound, and well expressed. We cannot all write either with elegance or learning. But, there are few farmers that are subscribers to the Register, who are unable to express the results of their experience, in "brief and good phrase." Numbers have already attempted it, under their own signatures, with complete success, and beneficially, to the community. We ought all to be aware that your work is not intended for the display of fine writing or book learning; and, whoever writes for it, should make his style as plain as he can, avoiding *technicalities*, when it can be done, as well as quotations from the foreign or dead languages. These are but evidences of pedantry, at best, when there is a corresponding expression in our own tongue. The sciences, connected with agriculture, have peculiar *terms* that cannot be well dropped; but, wherever it is possible, the common parlance mode of conveying the same idea ought to be employed also, that every class of readers may get the meaning with the least trouble.

The correspondent alluded to, *Peter De Quir*, ought to have *practised* on his own rule. He adds a P. S. to his letter, and asks the following questions, to be answered, either by the editor, or some of his friends:

"Is it ever advantageous or proper to burn land? Is there any kind of vegetation which grows in our fields, that it would be more profitable to burn off than plough under? Will the ashes produced thereby, compensate for the loss of vegetable matter? Will not the crop be better the first year when coarse grass or broom sedge is burnt, than it would be, if ploughed in? But will not the land be ultimately benefited in a greater degree by turning in such a cover?"

Many years' observation on the subject of these questions has enabled me to form an opinion on them, which I think is not essentially different from the opinions of most practical farmers. That opinion, however, is at the service of P. D. Q. and others, who have doubts on so plain a subject.

There are very few circumstances that can justify burning. With some men, who use small ploughs, and advocate shallow ploughing, it is a custom to burn the dead vegetable matter on their fields, when it is the least in the way of their ploughs, and particularly for corn and oats. I have endeavored to reason several out of the practice; but was actually laughed at by them, as a theorist. I have noticed, that, if the dead matter be so thick as to impede the perfect operation of ploughing it *under*, the after tillage, if corn be the crop, is more difficult; and when the covering be

broom sedge or very coarse grass, the first crop is apt to suffer, from the ground not being properly pulverized in time. If the crop be wheat or rye, it is greatly helped by turning in any sort of cover. Grasses and weeds with their roots and sods are frequently gathered into piles by the harrow, after bad ploughing; yet, upon these very spots the crop is almost always more luxuriant and productive—showing, plainly, the advantage of the vegetable matter thus gathered together.

After any heavy covering is ploughed under, which is more easily done with the help of a weighty chain, the harrow should follow while the ground is mellow, and then the roller. The harrow fills up all the cracks and breaks left by the plough, levels and pulverizes the soil; the roller mashes it down and presses the layer of vegetable matter into a small compass. When thus treated, fermentation and decomposition follow as soon as enough heat and moisture are supplied by the seasons. Whatever is thus turned under in the fall or winter, will be found mouldy and tender in the spring, and soon becomes food for plants. Broom-sedge is the most difficult to make rot; but even that rots time enough to benefit wheat. If the unavoidable openings and seams left by the plough be not filled up and pressed down, fermentation will not take place soon enough, in consequence of a too free circulation of air: and the soil on top, not coming near enough to the earth below, is apt the sooner to suffer from drought. But these things are too plain to occupy more time in explaining.

Some of the largest corn crops ever produced in the United States, were made on land, in good heart, that was covered over with a thick sod and coat of vegetable matter. It was well manured, broad cast; whirled completely over, harrowed and pressed down with the roller. But the after tillage was not more than three inches deep; neither breaking nor turning up the sod again. I am inclined to think that all vegetable matter put below the operation of tillage and pressed down, must greatly improve the land, and if not disturbed, enlarge the crop growing, during the process of decomposition. The stratum will not be thick: it freely admits and retains moisture, and as soon as the mould commences to rot, supplies abundant food to the roots that are spreading out in every direction in search of food.

The tobacco planter's mode of cleaning new ground, by raking up the leaves and trash and half decayed vegetable matter, and then *burning* it all, is a wasteful operation. These materials, if spread on exhausted spots in the fields, and ploughed in, would impart life enough to throw up such a crop of rye, or oats and clover, as to make it easy afterwards to restore them to their original fertility. The use of wheat straw, chaff, or leaves will result in the same benefit. It is contended by some of the best farmers, that top dressings of straw and chaff is the best mode of using them for improving land.

He that advocates burning, will be convinced of its rapidly impoverishing effects, by taking an acre of his best soil, cultivating it in his usual way—carrying off all the crop, and after small grain, burning off the stubble, and then the grass in the fall, and burning the grass also in the fall, after corn. This process will entirely exhaust the vegetable matter in the soil, and render it literally steril. Those crops have been considered the most improving which either leave the most on the ground, or add most to the manure heap. In the culture of tobacco, all other vegetation is kept entirely down quite until frost, and all the crop, save the root and a short end of the stalk, is carried off. The renovating nature of the clover crop is mostly owing to the tap root of the plant being so large and long, keeping the land light and divided, and its yielding such a heavy coat of vegetable matter. It throws up successive crops of spires and leaves in the same season—the earlier constantly falling and decaying amid the springing verdure of the younger growth, until frost chills all vegetable life. Below the mountains the heat of summer matures the greater part of the first crop, and dries up that as well as the younger shoots. But as soon as "the dogs days" are gone, the verdure starts again. Whoever examines a field that has stood in clover, will find it covered with a black fertilizing dust or mould, more or less perceptible, as the rains have been light or heavy. Such of it as has become decomposed is apt to be partly solved by rains, and the whole to be partly mingled with the top soil. From its tender succulent nature, clover rots sooner than weeds or grass, and becomes nutritive to plants. But the same process takes place, and for the same wise purpose of nature, with every species of vegetation, from the majestic forest tree down to hair-like hen's grass—converting all into fertilizing matter. The ratio of their value is probably unknown to the most skilful in the science of chemical analysis. But I did not take up my pen to write an essay on manures.

That ashes are stimulating to plants, or rather, aid in the process of feeding them, is well known, and they are highly valued by every good husbandman. But I have never seen any vegetable growing in pure ashes, and infer that their action is in combination with earth and putrescent matter. The quantity of ashes left on land after burning, is so small, compared with the quantity of unquestionable food for plants that would be created by the decomposition of the same covering, that the loss by burning must be manifest. Let any one burn a portion of hay, straw, grass, or weeds in such a way as to save all the ashes. He will be surprised at the smallness of the quantity. Let him spread it on a plot of ground, and then spread the same weight of the material burnt, on another plot of the same size, and either plough in or not. The mere *contemplation* of what would be the result, it seems to me, will decide the question. If not, I am egregiously mistaken in my notions, and ashes are worth more than their weight in silver!

It is sometimes necessary and "advantageous" to burn meadows when they begin to be overrun with broomsedge; for the three-fold purpose of destroying the seeds of the sedge—giving the grass a chance to rise and cover the ground in the spring before the later growth of sedge puts up—and enabling the mower to cut the grass clean. When it is not convenient to plough up and re-seed the meadow, burning will make it hold out against the encroachments of wild growth two years, and sometimes more, beyond the time at which, without burning, the hay would hardly be worth cutting.

Wire grass and its roots should always be burnt; and so ought thistles. Fire is the surest destroyer

of these pests. Briers are easily cut down with knives made for the purpose, and they form a valuable covering over galled spots, or add to the manure bank. When not in patches the plough sufficiently masters them. Annual burning tends to impoverish and harden the soil of even the richest wood land.

I have, Mr. Editor, in a lame, and I fear, tedious manner, endeavored to answer your correspondent, *Peter De Quir*. Since he did not act on his own recommendation to others, he cannot complain that his queries have not been responded to *in propria nomine*. But, if he does, he has only to adopt the Arabic mode, and read backwards.

RIUQEDRETEP.

REMARKS ON THE PAPERS CONTAINED IN NO. 9 OF THE FARMERS' REGISTER.

To the Editor of the Farmers' Register.

Presuming that the chief motive of all who write for your paper, is, a sincere desire to benefit the cause of agriculture, I shall take it for granted that none will be displeased by the expression of any doubts or objections to which their communications may give rise—provided there be nothing blameable in the temper or manner of doing it. Nearly as much good may sometimes be done in this way, as in any other.

Influenced by this belief, I shall proceed without farther preface, to offer such remarks as have suggested themselves to my mind in perusing your February No. They will be presented without connection, and without regarding any thing but the order in which the several articles commented upon, follow each other in your paper.

What is meant by the terms—"brakes" and "peat-moss" in Mr. James Hale's premium dissertation? The first is a provincialism not understood in middle Virginia, and the second is not generally believed to exist in the United States—if what is so called in England, Scotland, and Ireland can be found in them at all.

Mr. Hale's plan for collecting and making manure by "a compost heap," I like much, saving the location which he recommends; since I am perfectly sure that no farmer with a Virginia-nose could possibly be prevailed upon to concoct such "a rank compound of villainous smells," (as Falstaff said by the buck basket,)—"not far distant from the back part of his house."

Is it a fact so well established as to justify his unqualified assertion of it, that "farm-yard manure" should be suffered to remain from spring and summer, "till the next fall, when, together with the dung and urine of cattle, with which it is mixed, it makes an excellent manure, and should be carted out and laid in large heaps, for the purpose of being placed in the hills of Indian corn or potatoes the ensuing spring?" Is it another fact also so indisputably settled as to require no proof, that, "stable-dung and animal manure ought to be spread on tillage-land designed for corn or potatoes the spring after it is made, and well mixed with the soil by the harrow first, and then the plough?" Has he ever made fair comparative trials of any different plan, or seen others make them, where the manure was applied on the surface, and in a much fresher state? If he has not, can he be called a *competent* judge?

With Galen's communication, I was, upon the whole, much pleased; although I must say, that he delivers his opinions—however important the subject, rather too abruptly. For instance, he asserts—without the slightest doubt or qualification, that, as to plants, "the earths afford no real nourishment themselves, but act entirely as exciting agents." Now, do not all agriculturists admit that there *is* such a thing as *the food of plants*, and that it is supplied either by *the earths*, or *by water*, or *by both?* Will they not also admit, that "exciting agents" cannot, with any propriety, be called suppliers of food? Where then is Galen's authority for assuming *that* as a fact universally admitted, in support of which, he offers nothing, but his *ipse dixit?* His concluding sentence furnishes another instance of a highly important assertion, entirely without qualification, or illustrative argument to sustain it. I subjoin his own words: "There is a wonderful similarity between the vegetable and animal world; they are both governed by the same laws—the various agents that act upon them are similar," (to both these assertions there are numerous and striking exceptions,)—"their organization in many respects the same, and they both possess motion, sensation, and life." This last assertion also, is much too broad; for, not to cavil at the term, "possess motion," instead of the power of motion, the motion and sensation ascribed to vegetables are as really unlike the motion and sensation of animals, as any two things can possibly be, between which any sort of resemblance has been supposed to exist. Such fanciful analogies may do very well as ornaments of style, but not for scientific agriculture.

Your correspondent N. E. Read, in his valuable communication, has stated many interesting facts. Few of your friends, probably, have furnished more within the same compass. His general remarks, before he comes to specifications, are particularly good. As to his "new method of preserving sweet potatoes," I have no doubt of it being good; but if an old, a cheaper, and safer mode will answer perfectly as well, why change it? Such a method has been followed in my part of the country, as far back as I can remember, and has been practised with entire success. It is to put them away in dry sand—as I see also recommended in your February No. Thus preserved, I have often eat them late in April perfectly sound; and this mode has the advantage over Mr. Read's in keeping the roots under lock and key, in a cellar, where they are safe from the depredations of our slaves, who have quite as "sweet a tooth" for sweet potatoes as we ourselves have.

Of his plan for preserving dried peaches, apples, &c., I can say, *probatum est.*

His remarks headed "Tar, Pine-tree, wood for fuel," appear to me of so much value, that I should rejoice to see them in some of our newspapers—taking place of the miserable party politics with which they are so incessantly gorging and disgusting all true, honest lovers of their country, all who really prefer its peace, harmony, and happiness to all other political considerations whatever. As fire dispels noxious and fœtid miasmata from the natural atmosphere, so might such publications—treating as the latter part of Mr. Read's does, of a most important branch of rural economy—dispel from our political party-papers, by their

occasional insertion, all those putrid exhalations from corrupt sources which are so constantly contributing to render our political atmosphere poisonous to the moral health of all who voluntarily inhale it.

Dr. R. R. Barton's remarks on the neglect of agricultural education are perfectly just and true. If agriculturists in our own state would only regard them as they ought, a very few years would suffice to give our good old Mother Virginia an entirely new—rich, and most beautiful suit of clothes, instead of the rags that her sons now keep her in, until many of them get so ashamed of her, as to run away in search of some new foster-parent, to be treated probably in the same way. Pattern and experimental farms, connected with schools and colleges on the manual labor system, would indeed be a reform of infinitely more importance to our national welfare, than all which our political parties put together seem ever likely to accomplish towards its achievement.

The extracts from the Complete Grazier are very interesting in themselves; but before we self-satisfied farmers of Virginia can derive much practical benefit from them, we must become *a little more* anxious to convert our hereditary broom-straw old fields into rich pastures; and *a little less* dependent upon the hides of our winter and spring-starved cattle for leather to make our negroes' shoes.

Horizontal ploughing was practised, to my certain knowledge, in the county of Essex, Virginia, nearly or quite half a century ago, by a Mr. Spindle, and some few of his neighbors. Still Mr. Thomas M. Randolph was the first, I believe, to make any publication about it, and with him probably the plan was original, as well as it had been with Mr. Spindle. This kind of ploughing, however, unless very accurately performed, and unless the land be also coultered as deep as practicable, with a single coulter or substratum plough, is but a very partial remedy, (if it be one at all,) for the evil it is designed to prevent. By the way, it has given rise in some "benighted corners" of our good old state, (for *she* also has a few such places,) to the practice of "laying off" our dead levels with the same crooked furrows that we "lay off" our hills, under the very sagacious and mathematical calculation, that, because *one* crooked row between any two points is certainly longer than a straight one would be between the same two points, therefore, the whole level thus laid off must contain more corn hills! Ye who govern yourselves by the dogma—"*nil admirari*," keep from stretching your eyes at this fact—if you can!

As to the causes of rust, smut, and other diseases in wheat, corn, &c., the dissertations on them, of which A. N's. is as good as any, and of which I believe that I have read some hundreds, have always seemed—to say the least of them—very useless speculations, unless accompanied by some remedy. Indeed, in regard to several of the diseases treated of, the investigation of their causes, even when deemed successful, has appeared quite as profitless as would be a demonstration of the causes of dry and wet weather. No cure, as far as I recollect, has ever been found for any of these diseases, any more than for too much drought, or too much rain. The smut, perhaps, is an exception. But be it remembered, that burning and liming was ascertained to be a preventative long, long before any person so much as even dreamed of the wonders said to have been performed by Mr. Francis Bauer with his smut-balls; and in regard to which, I shall take the liberty, at least to suspend my opinion, until farther evidence be exhibited.

Far be it from me altogether to deny the use of such investigations; for I know well that diseases both in the animal and vegetable kingdoms are not to be cured, unless by accident, without a previous knowledge of their causes. But I would have such researches after the origin of these diseases more frequently accompanied than they are, by details of apparently successful attempts to cure them. It is chiefly owing to the want of the latter, that "book-farming," (as it is often scoffingly called,) is in such bad odor with thousands of agriculturists, who cannot be persuaded that it is any thing better than mere speculation. Read to them as many as you please of such achievements as Mr. Bauer's, and such dissertations as treat solely of such matters as the origin of those diseases which often destroy our crops, and they are ready with Sancho Panza's answer to his master Don Quixote, who, after Sancho's drubbing at the celebrated braying adventure, undertook to explain to him very learnedly, why it was that he felt so grievously sore. The squire's reply was;—"Before God, your worship has brought me out of a grand doubt, and explained it in very fine terms. Body 'o me! was the cause of my pain so hid, that it was necessary to tell me, that I felt pain in all those parts, which the pole reached? If my ankles ached, you might not, perhaps, so easily guess why they pained me: *but to divine, that I am pained because beaten, is no great matter.*"

Friend Jeremiah's association of "hogs, legislators, and manure making," seems, to say the least of it, a very queer one. Has he ranked them according to his scale of merit, or is the climax accidental? This is a question I should like him to answer, for verily I suspect him in these plotting times, of some insidious designs against the honor and dignity of our legislative bodies—either state or federal.* His Jeremiads about "stump and barrel love of country," and "stump and barrel legislators," chime in with my notions on these subjects so marvellously well, that I should like to have some more of them. I have always considered such things full as great enemies to good legislation, as cut-worms, chinch-bugs, and Hessian flies are to good crops.

Shenstone, in my humble opinion, is more "*equal to the task*" to which he seems to think himself inadequate, than he supposes. For one, therefore, I should like to hear more from him.

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*As our correspondent Jeremiah has been thus called on to explain or defend the title to his communication, it is proper to state, that the offence was not his, but ours'. His communication had no heading—and, as in all similar cases of omission, we attached such as seemed suitable.—Ed. Farm. Reg.

To X. Y. Z. I beg leave to extend the friendly hand of a fellow sufferer. Our feelings and opinions about "the fence tax" correspond perfectly. But I would earnestly recommend to him and all others entertaining similar opinions, not to consume any more time, paper and ink, in writing on the subject, either in your paper, or elsewhere—at least until they try every effort to procure a majority of legislators, who not only understand the interests of husbandry better, but have a much stronger regard for them, than has ever yet been manifested by any heretofore chosen. The truth is, that these interests are either not thought of at all, or always postponed as matters of very subordinate concern, and so they are likely to be forever, unless we cease to make a man's party politics the first requisite for legislation.

The article on Merino sheep, places those animals in their proper rank. It is a great pity but our countrymen in general had thought as the writer does, before the mania on that subject seized them some twenty odd years ago. Many a poor fellow would have his money by it, instead of being gulled out of it to the tune of thousands upon thousands, by certain gentlemen who were selling off their rams almost as fast as they could be delivered, at a thousand, twelve hundred, and fifteen hundred dollars apiece! But "to play the fool sometimes" seems to be a necessary evil, to nations as well as to individuals.

The above notices are sent by way of experiment to ascertain how you and your various correspondents may like such liberties being taken with their communications, by one who is perfectly willing that still greater should be taken with his. A single hint will suffice hereafter to silence forever—at least in this way—your friend and constant reader

COMMENTATOR.

BOTANICAL DESCRIPTION OF BROOM GRASSES, AND OF PINES.

To the Editor of the Farmers' Register.

The genus *Andropogon* includes those plants which, in the southern states are known under the name of "Broom-grass." The most common species, according to Mr. Elliott, is the *A. dissitiflorus, (Mich.)* or slender spiked Andropogon—spikes solitary, conjugate, as long as the sheaths; flowers by pairs, the hermaphrodite awned; with the awn straight, scabrous, caducous. Stem erect, three feet high, branching, with the branches appressed; leaves long, linear, scabrous; sheath contracted and hairy at the throat. Spikes hairy—grows in close soils—flowers in October.

Another common species in our fields is the *A. scoparius*, of Michaux. Spikes simple, on peduncles, by pairs, forming straight panicles; flowers by pairs, the hermaphrodite sessile, awned; the neuter on a footstalk awned; the rachis ciliate. Stem herbaceous, three feet high, very glabrous, slightly compressed, furrowed on one side, tinged with purple, grows in dry poor soils, very common.

Your "woods broom straw", may be *A. macrouros* of Michaux. Panicle clustered, spikes conjugate, clustered, stem three or four feet high, slightly compressed; flowers in clustered panicles, terminal and lateral, but generally near the summit of the stem—flowers in October.

Cluster flowered broom grass. A variety of this has its leaves very glabrous and *glaucous*—grows in damp soils.

Andropogon argenteus, (white spiked broom grass.) Spikes conjugate, longer than the sheath, clothed with white, silvery hairs. Stem three feet high, branching from the base, very glabrous, tinged with purple: grows in dry soils—flowers in October.

The species of the genus in this section, form a very natural family and are not easily distinguished; they cover our poor pastures in the fall and winter with their coarse, dry foliage, and are known by the common name of *broom grass*. Together with the *Pinus taeda* they usurp nearly all the uncultivated "old fields" of the southern states.

The *Pinus taeda* grows naturally in the rich, wet soils of the southern states, mingled with other forest trees. It is the largest of the southern pines, and its seeds being easily, and almost universally disseminated, over the country, it is the first to spring in those lands which are thrown out of cultivation, and hence has acquired pretty generally the name of "old field pine." Leaves six to ten inches long, by threes, cones shorter than the leaves.

Pinus variabilis. Leaves by pairs and by threes, slender channelled; cones small, (two to three inches long,) solitary; grows along the sea-coast of Carolina and Georgia.

P. rigida. Leaves by threes, the sheaths short; cones ovate, scattered or clustered—flowers in April.

P. serotina, (pond pine.) Leaves by threes, long, (six to eight inches;) cones three-fourths of an inch, globular, frequently opposite in the small branches; grows in damp soils.

Pinus palustris is the pitch pine of the southern states, called "long leaf pine." Cones six to ten inches long; leaves twelve inches long. The south eastern part of Virginia is its northern limit. This tree affords most of the turpentine of commerce. The name *palustris*, originally imposed upon it, (by Linnæus,) is a great misnomer, as it never grows in *swamps*. The younger Michaux, in his splendid work on the "Forest Trees of North America" has endeavored to correct this error, by calling it *Pinus australis*, (southern pine,) but he has not been followed by other botanists, who (as Cicero said of himself) "prefer to err with Plato, rather than think aright with others."

Pinus inops. (Jersey pine.) Leaves short, by pairs; cones recurved, as long as the leaves. It is probable that this species is found with you.

The "Encyclopædia of Plants" is a useful book, especially to learners. From the index at the end you may find any *genus* which it contains. The first column of figures on the left hand in the index, refers to the page. On that page you will find one species (or more) of each genus figured. The *number* attached to the figure refers to the *species* above. Beneath, you find remarks on each genus, &c. The best work yet published on the botany of the south, is the "Sketch of the Botany of South Carolina and Georgia," by Stephen Elliott, of Charleston.

Dr. Forrey, of New York, contemplates pub-

lishing a new Flora of North America, brought down to the present time. It is a great desideratum, and the work is in good hands.

[The foregoing are answers to queries sent to our correspondent, and not designed for publication—but we have taken the liberty thus to use the extract, presuming that there can be no objection.]

Henry county, March 7th, 1835.

To the Editor of the Farmers' Register.

The subjoined remarks I received from one of the most experienced commercial houses of Richmond, upon the management of tobacco (our staple.) I think they contain useful, solid, practical suggestions, which if made public, as the prizing season is now approaching, may be of service to this region of country, though they were not thus intended by the author, being merely addressed to me in a letter, after making sale of my crop. If you should think them of sufficient importance to give them a place in your Register, you can do so.

Respectfully, yours, &c.

G. H.

USEFUL HINTS UPON THE MANAGEMENT OF TOBACCO.

We take the liberty of offering some suggestions for your consideration, in the management of your tobacco, which our experience here, as well as remarks made to us by our friend in Great Britain, induce us to believe, if adopted, would add materially to the value of tobacco for the British markets. The tobacco should be so assorted, as that each hogshead be uniform in color, size, and substance, well cured, and with as little fire as can be applied, to secure against injury in the sweat—prized as it can be to avoid injury by breaking the leaf. It should not be bruised by heavy prizing, it being important that the tobacco when taken from the hogshead for use, should be free and leafy, not matted and stuck together—from 1,300 to 1,500 according to the quality of the tobacco, being sufficiently heavy for the hogshead. In place of its being prized flat and open, the leaves of the bundles interlocking with each other, the leaves should be closed and appear as if each bundle had been drawn through the hand, laid straight in the hogshead, a bundle only at a time, so that when the sample is drawn, it looks bulky for its weight, and each bundle separating from the other without force, which preserves the leaf from being injured by breaking, when handling for use. We are satisfied that such management will be well compensated by the additional price the planter will obtain for his tobacco. We presume you are aware of the importance of tobacco standing on the ground until it is fully ripe. Many planters err by cutting too soon. Stout body, that is rich, thick tobacco, is greatly preferred. As to color, from a lively bright to a nutmeg brown, are preferred. Red, or what is familiarly called "foxy," is the worst color. Green is also objectionable; but a mixture of green and yellow, when the tobacco is new, is a good color. In the sweat such, in a good degree, loses the green appearance.

ON THE PROPER MANAGEMENT OF POSTS, WITH REFERENCE TO THEIR DURABILITY.

To the Editor of the Farmers' Register.

Perhaps there is no subject connected with agriculture, on which a greater diversity of opinion prevails than the question, whether, with reference to their durability, posts should be put in the ground green, or seasoned? When I first settled, I took considerable pains to inform myself on this point, by consultation with those whose experience, should constitute them proper fountains of information. The diversity to which I have alluded, impaired greatly the acquisition of decisive results. Mr. Thomas Thweatt, of Dinwiddie, (a gentleman of great judgement and observation on all agricultural subjects,) related to me a circumstance which contributed much towards the attainment of my object. He stated (if my memory be correct,) that in the erection of his garden—a sufficient number of posts as he supposed, were prepared and suffered to remain until they were thoroughly seasoned. Its completion, however, required one in addition, which was taken from an adjacent tree, and immediately put in the ground. Seventeen years had elapsed, and every post had rotted down except that one, which remained sound. In the progress of my investigation another instance was related in which an entire side of a garden exhibited the same results. My own limited experience furnishes an incident worthy of being mentioned. My garden enclosure was erected of posts while green. Several pieces remained exposed, until they were completely seasoned. Out of these a horse-rack was constructed, which has entirely rotted down, while every post in the garden remains firm. From these facts I deduce the belief, that a post planted when green will last longer than one previously seasoned; and for the reason, that the operation of seasoning produces cracks in the timber, which admitting the moisture from the ground cause its decay. I recollect to have read the account of an experiment, proving that the inversion of posts, from the direction in which they grew, operated beneficially. Two gate posts were hewn from the same tree—one was planted in the manner in which it grew, the other inverted. The former rotted down while the latter was sound. It was accounted for in this way—that nature had formed valves for the *ascension* of the sap, which allowed the moisture from the ground to penetrate through the same channel; but that the inversion of these valves, interposed a barrier to its admission. This theory corroborates the idea previously expressed, that the moisture of the ground, alternately penetrating within the timber and in droughts, measurably receding, causes its decay. Whether the posts should be cut while the sap is up or down, I am unable to determine. A writer in some of the numbers of the American Farmer, states that oak timber should be cut while the sap is up, because it is glutinous and forms a cement, or substance which acts as a preservative.

I have ventured to express these hasty and imperfect reflections, with the hope that though they may not impart any useful information, they may elicit some from others. These are controverted subjects, in which every person who erects a gate or encloses a garden is deeply interested—and their further discussion will be valuable, at least to

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For the Farmers' Register.

FURTHER OBSERVATIONS ON THE GREEN SAND AND CALCAREOUS MARL OF VIRGINIA.

By Wm. B. Rogers—Professor of Natural Philosophy and Chemistry, William and Mary College.

In a communication published in the 3rd No. of the Register, I announced the discovery of the green sand, or silicate of iron and potash, in the ordinary tertiary marl in Lower Virginia. Geological considerations, taken in connexion with this discovery, led to the inference that an older deposite, consisting in much larger proportion of this peculiar substance, would be found in a region more remote from the seaboard, and not far below the head of tide; and from the great agricultural value of this substance, as proved by the experience of the farmers in New Jersey, I was induced to point out its probable position, and to give such hints and directions with regard to its accompanying indications as might prove useful in any researches which might be undertaken by persons residing in the region in which it was supposed to exist. Since the publication of the paper referred to, as far as other engagements would permit, this important inquiry has been actively continued, not only in reference to the presumed deposite above mentioned, but also to the extensive calcareous formation of our lower counties.

Besides the practical importance of this investigation to the agriculture of a large district of the state, in a purely geological aspect, it was calculated to excite the highest interest. In the vast region of our tide-water country, at farthest, only two members of the *tertiary* group of formations had been hitherto discovered, and no decided indications of a *secondary* deposite likely to prove interesting to men of science, had been found. At the mouth of the Potomac, and at some other points, a deposite had been detected by Mr. Conrad of Philadelphia, which from the great predominance of shells of *existing species*, was regarded by him as belonging to the upper or *newer tertiary*, and as analogous to the Crag of England. The same eminent conchologist by an examination of numerous fossils from York town, Suffolk, the James River, near Smithfield, and other localities, had clearly proved that this portion of the *tertiary* series was of greater antiquity than the former, and accordingly he has recently applied to it the title of *middle tertiary*—which, as some geologists in Europe divide the tertiary group into *four* periods, would include both the second and third of these subordinate formations. The *lower tertiary*, which Mr. Conrad had so successfully investigated in Alabama, had not as yet been brought to light within the limits of Virginia. Thus, therefore, these inquiries appeared fraught with the lively interest of scientific discovery, while at the same time they inspired the animating hope, that in some of their results, they might eventually be found conducive to the interests of an important district of the state.

From the great extent of the *middle tertiary* of Lower Virginia, it was to be expected that, notwithstanding the diligence and learning of those who had visited several of its interesting localities, with the view of studying its fossil contents, an extensive field of future discovery would be opened to the scientific explorer—and a great variety of new and peculiar fossils would be brought to light. To a certain extent this anticipation has been realized; and the occasional examinations which I have made in this vicinity, and at some remote points, have been rewarded by an extension of the list of fossils, and the discovery of a number of new and interesting species. To the readers of the Register, generally, the details of these observations would appear unimportant, if not useless, and must therefore be omitted. At the same time, I may be allowed to add, that such facts are frequently invested with a *practical interest*, by the aids which they furnish to other and more important discoveries; and that, however little value, in the abstract, would attach to an enumeration and description of the shells, zoophytes and other remains of our marl banks, they are absolutely essential in studying the physical history of this portion of the globe, and may prove of some assistance not only in guiding the researches of the farmer after marl, but in directing his choice of calcareous manure when various deposites of this substance are offered for his selection. Of the latter point, several striking illustrations might be adduced—but I shall content myself, for the present, with the statement of a single fact. A small shell of rough exterior, and rather irregular form, a species of *chama*, is frequently found in very extensive beds in this vicinity and at other points, forming nearly the entire calcareous portion of the deposite. From its peculiar form and friable character, it is most generally in a condition to be eminently serviceable as a manure. As the strata both above and below are often of a very different texture, though perhaps nearly equal to it in regard to their calcareous contents, a choice is at once presented to the farmer, in which, he will be guided even more by the nature of the shell embedded, than by the comparative abundance of carbonate of lime. But so little attention has been paid to the characters of the fossils contained in our marl-banks, that even in places where the manure has been longest and most successfully in use, a less valuable stratum is sometimes selected in preference to one of superior fertilizing power. A more minute observation of such particulars, can scarcely be expected in the absence of some popular guide, in the form of delineations and descriptions of the more prominent shells, exempted as much as possible from technical or merely scientific phraseology. Some such illustrations may hereafter be furnished in a cheap form in the progress of a geological examination of the eastern region of our state.

Since the publication of my former paper, a great number of additional observations have been made with regard to the green sand contained in our ordinary middle tertiary marl. Its uniform presence in this deposite, in a greater or less proportion, seems now to be sufficiently established. That it is *generally* present in sufficient quantity to enhance in any important degree the agricultural utility of the manure, it would be going much too far to assert; but that in many cases the proportion is such as cannot fail of producing highly beneficial effects upon vegetation, would seem to be demonstrated not only by the long experience of the farmers of New Jersey with the green sand itself, but by the observations of individuals amongst ourselves who have been in the habit of

applying a calcareous marl in which this substance is peculiarly abundant. In the vicinity of Williamsburg, almost every variety of the common marl may be found; but that which has been observed to produce the most striking effects as a manure, has uniformly yielded to chemical examination a comparatively large proportion of the green sand. When therefore, it is in the power of the farmer to make the selection, such marl should be chosen, as, along with a large proportion of calcareous matter in a suitable state of subdivision, contains also as great an amount as possible of this auxiliary manure. The beds of *chama* already referred to, as abounding on some estates in this vicinity, are peculiarly rich in this ingredient, and are hence, as well as from their friable texture, generally selected in preference to all others. In some of these deposites, as large a proportion as thirty, and in some specimens forty per cent., has been found; and in cases like this, if we are to trust to the experience of New Jersey, a very marked addition to the fertilizing power of the marl must be ascribed to the presence of this ingredient.

In alluding thus to the influence of the green sand as an auxiliary manure, the inquiry naturally arises, to which of its ingredients are its meliorating effects to be ascribed, or do they arise from the conjoint action of the potash and oxide of iron which it contains? To this inquiry, perhaps, it would be premature to attempt to respond. At all events, the rationale of its action cannot be given with that certainty, which in such matters, it is desirable to attain. As stated in the former communication, its components are protoxide of iron, potash and silex; the latter ingredient appearing to act, as it is known to do in many rocks, in the capacity of an acid. In virtue of the potash contained in the green sand, we would naturally infer an agency in neutralizing acids similar to that of lime, or its carbonate—and the extent to which the manure possesses this property, must appear still further increased when we advert to the chemical nature of the protoxide of iron.

Iron, like most other metallic bodies, combines with oxygen in more than one proportion. These compounds, or *oxides* as they are termed, are two in number, and in accordance with the general rule adopted by chemists in designating this class of substances, that which contains the least proportion of oxygen, is called the protoxide--that containing the most, the peroxide. The rust of iron, and the red coloring matter of ochreous clays and of bricks and tiles, are impure specimens of the peroxide of iron. The protoxide is never found in an uncombined condition; and such is the avidity with which it imbibes an additional quantity of oxygen, or unites with carbonic and other acids, that it undergoes a rapid change whenever disengaged. Hence, under favorable circumstances, a strong neutralizing action might be anticipated from this ingredient of the green sand. We may therefore, for the present, rest our explanation of the agency of this manure upon the alkaline properties of these two constituents, the potash and the protoxide of iron. But in suggesting this explanation, it must be freely confessed that, especially as relates to the action of the protoxide of iron, it must be looked upon as problematical, and requiring for the establishment of its truth, an experimental knowledge of the influence of this substance upon the growing vegetable, of which nothing has as yet been positively determined.

As already indicated, when these inquiries were entered upon, and at the time when my first communication appeared in the Register, the existance of a *lower tertiary* deposite in Virginia had not been ascertained. The industry of Mr. Conrad had brought to light a formation of this nature in Alabama, and had led to the probable inference that it might be found in Maryland. Moreover one or two of the fossils obtained from the editor of the Register encouraged the hope that it might be found in our own state. The observations of that gentleman respecting the gypseous earth of James River* had appeared some time before, and though nothing positive could be gained from them, in relation to the geological character of the deposite, to which he affixed that name, they threw out the important and sagacious suggestion, that this earth was the same with the green sand of New Jersey, or at least a substance of analogous character. We shall in the sequel, learn that though geologically the two formations belong to periods which are distinct, the gypseous earth contains a large proportion of that particular ingredient, (the green silicate of iron and potash,) of which the New Jersey deposite almost exclusively consists. We are therefore indebted to the editor of the Register, for the announcement of the important fact, that the green sand, or a substance analogous to it, existed in certain localities on the James River.

Following up the suggestions of geological analogy, alluded to in my first paper, and stimulated by the observations and statements of Mr. Ruffin, I have been enabled by personal inspection, and through the kindness of correspondents, to ascertain with certainty, the existence of a *lower tertiary* deposite, throughout an extensive district of Eastern Virginia, and moreover to determine what is far more important to the agriculture of this region, that the deposite in question comprises immense strata of green sand, nearly, if not quite, equal in value to that which is in use in New Jersey. The reader, however, is by no means to infer from the existence of the green sand so abundant, both in this lower tertiary and in the New Jersey formation, that the two deposites belong to the same geological era. I have already stated that the New Jersey green sand, is a *secondary* deposite—and of course anterior to the formation here designated as lower tertiary. The shells and other fossils, entombed in the two deposites are strikingly different, and characteristic of difference of geological antiquity. As it is desirable that clear ideas should be entertained, in relation to the distinction here drawn, I would claim the indulgence of the reader, in presenting such explanations, and illustrations, as are calculated to throw light upon a subject in which, at least in some particulars, all are obviously interested.

The term *primary* having been adopted by geologists as designating that extensive class of rocks which from various indications, appeared in general to have originated *first*, and which are destitute of all traces of animal or vegetable existence—the title of *secondary*, was of course appropriated to a class, apparently of more recent origin, usually overlying the former, and in which, in many

*Article "Gypseous Earth," Far. Reg. vol. I. p. 207.

cases, an enormous accumulation of organic remains had been discovered. A minute examination of these remains, consisting of shells, the bones of animals, &c., disclosed the curious fact that they belonged to races of beings of which, at present, there are only a very few living representations. Subsequent observations, first systematically made by Cuvier and Brogniart in the vicinity of Paris, further demonstrated that overlying the secondary formation of that region, there existed an extensive series of deposites of great thickness, the fossil contents of which were, on the whole, very dissimilar from those of the former—not only *all the species*, but many of the most remarkable animal and vegetable forms being distinct, while at the same time many of the species were observed to be identical with others now alive. The difference thus marked between the two series of deposites, uniformly prevailing wherever they were observed, led to the introduction of the term *tertiary*, to designate the upper and more recent. By scrutinizing in detail the tertiary series, it was soon discovered to consist of several distinct subordinate formations, characterized by peculiar fossils, and becoming more assimilated in their organic contents to the existing living world, in proportion as their position in the series approached nearer and nearer to the surface. The most recent systematic writer on geology, and one of the most learned and able geologists of the day, has distinguished four subordinate formations in the tertiary series—and has given to each a specific name, expressive of its relative period of deposition. Though unwilling to perplex the reader with the terms of science, I may perhaps be excused on this occasion for introducing the names here referred to, on the ground that they are likely to be met with frequently hereafter in geological descriptions of the tertiary deposites of this country—and as they are distinctive of *things* which are characteristically different, and which have received no other denominations so appropriate, they have a just claim to be received. The terms thus employed by Mr. Lyell, the distinguished geologist above alluded to, are—

1st. *Pliocene*, signifying *more recent*, and divided into *newer* and *older* Pliocene. Under this head are comprised some of the shell deposites near the mouths of our rivers.

2nd. *Miocene*, signifying *less recent*. To this formation belong most of our calcareous strata which have previously been referred to under the title of middle tertiary.

3rd. *Eocene*, signifying the *dawn;* indicating the presence of a few fossils analogous to living species, or in other words a dawning of that condition of the animated world which now prevails. Examples of this are furnished in the lower tertiary of Alabama, and the lower tertiary here alluded to as recently discovered in Virginia.

The nature of the materials in which the fossils of these different deposites are embedded is very various. Sometimes the formation is a soft sand or clay—sometimes a sandstone or limestone of comparative hardness. In some cases the deposition appears, from the nature of the fossils, to have been made beneath the ocean—sometimes at the bottom of an extensive lake. In the vicinity of Paris, there are three marine formations alternating with two of fresh water or lake origin; and from one of the latter, the celebrated gypsum or plaster of Paris is extensively quarried. In Virginia, no traces of a fresh water tertiary have as yet been discerned. The general direction of the deposite is horizontal, and the whole appears to have been formed at successive eras beneath the waters of the ocean.

From what has now been said, it will at once appear that strong features of resemblance are presented in the geology even of the more recent formations in this country and Europe. The most striking similarity exists between the secondary of New Jersey and that of the Paris basin—as far as fossil contents are concerned. But in Paris, a great proportion of these fossils are embedded in chalk; whereas, in New Jersey, no chalk has been discovered, and its place is occupied by green sand, very similar to that, which, in the former locality, alternates with the layers of chalk.

The lower tertiary or eocene of Virginia is found in a band of variable, and as yet unascertained breadth, traversing the state nearly in a direction from north to south. It makes its appearance on both sides of the Potomac, in a line a little east of Fredericksburg. It then crosses the Rappahannock near Port Royal, the Pamunkey probably near Piping Tree, and the James River at Coggin's Point. With regard to its course further south, though its existence is known, additional data are required.

In general character, this formation may be thus described. At the base of the cliff or bank, there usually exists a stratum of what at first sight appears to be a blue or black clay, but which, on further examination, is found to consist principally of particles of the silicate of iron and potash, which when dried, becomes of a lively green color. Mingled with this substance are portions of common clay and sand, and numerous minute shining scales of mica. Embedded in the mass, and usually in a very friable condition, numerous shells chiefly of small dimensions will be found. Sometimes however, the matter of the shell has entirely disappeared, leaving a distinct cast or impression in the earth, by which its specific character may often be ascertained. Immediately above this stratum is a heavy deposite of what Mr. Ruffin has described as gypseous earth.* Large masses of crystalized gypsum, and sometimes the most beautiful groups of perfect crystals of this substance, are disseminated throughout this layer. It was this portion of the formation which Mr. Ruffin conceived to be identical with the green sand of New Jersey. In color, this stratum varies

* The term "gypseous earth," used in the article referred to above, was applied not to a part, (as here supposed,) but to the whole of that formation which Mr. Rogers has since shown to be of "green sand." But it was also stated, that by the general application of that term to the extensive beds which seemed to have had a common origin, (and formerly, the same chemical composition,) it was not intended to convey the opinion that all this earth contained sulphate of lime, either in crystals or finely divided. On the contrary, that ingredient was said not to be present, in any perceptible quantity, in but very few parts of the great body of what was there called "gypseous earth."—See Farmers' Register, Vol. I. p. 208.—Ed.

from a greenish yellow to a brown. Besides a considerable proportion of green sand, it contains, in addition to the crystalized gypsum, a notable amount of this substance in a subdivided state, and seemingly occupying the place of the shells which were formerly present, and have been decomposed under the chemical agency of some substance which filtrated in solution through the mass. Incumbent upon this bed is a thin layer of very pure white clay, of a texture which would recommend it to various useful purposes. Overlying the clay is a stratum of shell marl in a very subdivided state, containing masses of casts and shells approaching to the hardness of rock. This is the uppermost layer of the eocene or lower tertiary formation. Yet in some places a stratum of the ordinary middle tertiary marl rests almost immediately upon the former, and would not by an ordinary observer be recognized as distinct. At Coggin's Point, where the succession of strata now noted was observed, a thin and scarcely distinct layer of small brownish red pebbles intervened between these two layers of shells, seeming to mark a comparatively violent action of the waters in the interval of the two deposites. But an examination of the shells, in these two contiguous strata, affords abundant evidence of their belonging to distinct geological epochs. In the upper stratum the large scallops, the common oyster of our marl, and all the usual ingredien's of our middle tertiary or miocene formation, may be recognised. In the lower bed few or none of them exist, but certain characteristic shells belonging to the eocene period are entombed. Similar fossils appear below, in the green sand beneath the gypseous earth; and here a great variety of beautiful specimens may be discerned. An enumeration of these fossils in this place would of course be attended neither with utility nor interest, and indeed, were it advisable in the present stage of the inquiry, it could not be made, on account of the necessity of comparing the specimens with shells from other localities in Europe and this country, in order to identify species, and to decide upon those which are new, or peculiar to our own formation. That many such exist, I have every reason to believe, and with future leisure it is hoped that they will be named according to the fashion of the day, and described in the appropriate place. It will however be of real value to the reader, in any inquiries which he may institute, in reference to this formation, to obtain some general idea of the characters of two or three of the more conspicuous and characteristic shells. The observer will perhaps be able to recognize the following:—

1st. The *cardita planicosta*. This shell is of various sizes, rarely however equalling that of the clam. In form it bears some resemblance to that shell; but on the convex side a number of flattened ridges run from the knobbed extremity near the hinge, spreading from each other and enlarging as they approach the margin. The hinge part of the shell is very thick. This shell, occurs abundantly in the eocene or lower tertiary of Europe, and also in that of Alabama.

2nd. *Ostrea sellæformis*, or saddle-shaped oyster. This shell is very peculiar, having, when full grown, such a lateral extension on each side as to present, when the hollow of the shell is turned down, a very distinct resemblance to a saddle with its two depending flaps. It is found abundantly in the eocene of Alabama.

3rd. *Fusus longaevis*, a small shell less than an inch in length, and resembling in general form, those which are commonly called conchs. It is however flattened down on one side as if it had been subjected to pressure. This shell occurs abundantly in the eocene of Europe—but I believe has not until now been discovered in the corresponding formation of this country.

These three fossils, which are all found in great numbers in such of the eocene localities in Virginia as I have examined, are sufficient to identify the formation wherever they may be discovered. But as already indicated, they are accompanied by a variety of other shells, a large proportion of which, would appear to be peculiar to this particular region. It would seem that the eocene of Virginia though agreeing in most respects with that of Alabama, contains some fossils found also in the Paris eocene, and which are absent from that of Alabama.

In most of the specimens of marl from this region hitherto examined, besides a large amount of green sand, I have found a considerable proportion of gypsum, and in some of them as much as forty or fifty per cent. of carbonate of lime. Specimens received from Dr. Corbin Braxton, at the Piping Tree, were found to contain, along with much green sand, a great amount of the carbonate of lime, and some gypsum. Judging from its composition and texture, it must be looked upon as a very valuable manure. At Coggin's Point, the lower stratum before described, contains from sixty to seventy per cent. of the green sand, with a small proportion of carbonate of lime, and occasionally a little gypsum. The next deposite above, (the gypseous earth) abounds in gypsum, but contains less green sand than the former. Of this ingredient, however, it still possesses a very considerable proportion. In alluding to the powerful effects of the gypseous earth, in a trial which he made, the author of the Essay on Calcareous Manures describes them as much greater than could be accounted for by the proportion of gypsum present, and hence throws out the suggestion that some other fertilizing ingredient was contained in the earth. This additional effect must doubtless be ascribed to the presence of the green sand.

In prosecuting the geological survey of Maryland, Professor Ducatel has been enabled to ascertain the existence of a green sand deposite throughout an important district of that state. Of its existence on both sides of the Potomac I was already fully aware—and it affords me much satisfaction to find that the suggestions based upon general geological considerations, which were presented in my former paper, have already been so actively and ably followed up by this enlightened and diligent observer. Of the identity of some of the green sand deposites described in his report, with that now ascertained to exist in the eocene of Virginia, I am as yet by no means convinced; but a minute geological examination, such as that already instituted in Maryland, and that which is looked to with some interest in Virginia, cannot fail to throw very useful light on this, as well as all the other important deposites in the tide-water region of the two states. Mutual benefit would arise from the co-operation of surveys, conducted

at the same time in the two adjoining territories, and in this way the interests of the states, as well as those of science, would be most effectually and speedily promoted.

To the very meagre details, in relation to the green sand, presented in this communication, I may hope ere long to be enabled to add the results of extensive and minute personal observation in the interesting region in which the eocene formation has been detected. In the mean time, the progress of inquiry may be greatly furthered by the friendly aid of those who, from their residence in the region in question, will have it in their power readily to collect specimens of shells or earth, and to transmit them to me for inspection. I would therefore, earnestly solicit assistance of this kind, and in return, I will gladly communicate the results of any observations I may be thus enabled to make. To urge the importance of this, and other similar inquiries, would now no longer seem to be necessary—since a large portion of the intelligence and enterprise of our state appears prompt to recognize their value, and interested in furthering their active and successful prosecution.

From the New England Farmer.

STRING BEANS (OR SNAPS) DRIED FOR WINTER GREENS.

Mr. Fessenden—If you think the following statement of facts will enrich your weekly paper, and place in every farmer's reach an additional luxury, I shall look for it in your next number.

In consequence of a suggestion dropped in my hearing by an elderly farmer's wife, I took a quantity of string beans from the poles, last summer, (the Agricultural) [?] prepared them entirely for the pot, spread them on a large table-leaf in the sun, and dried them precisely as apples are dried. When perfectly divested of moisture, they rattled like nut shells, and excited no small degree of ridicule. I bore it quite philosophically, and laid the supposed treasure aside for winter. In February, I ordered a handful put into water at night, to be kept warm till the next day, dropping into them a little pearl ash. The next day I found them *green* and *swollen* almost to their size on the pole. They were boiled three hours, and tasted almost as if taken fresh from the garden. I had so pleasant a dish of them to-day, that I wished it possible for you, sir, to have shared the luxury with me.

Permit me to say, seamen would find them no less, and I believe more valuable, on long voyages, than dried apples, and the process of drying is the same.

SENEX.

Lancaster, March 12, 1835.

From the Genessee Farmer.

DRAG-LOG OR DRAG-ROLLER.

An implement has been in use in this part of the country for several years, which I have not seen elsewhere. It was invented by Thomas B. Gay, a practical and intelligent farmer of this county, and though it has perhaps only been adopted by some agriculturists in this vicinity, who are in the habit of preparing their grounds neatly for the reception of seed, yet it deserves to be better and more extensively known.

The implement is called indifferently *Drag-log* or *Drag-roller*, and differs in principle from the common roller being deprived of the rotary motion, and consequently *drawn* or *dragged* over the land. Such farmers as have used it fully concur in the opinion—to the correctness of which I can also attest from my own experience—that it is not only a convenient but frequently indispensable agent in reducing rough or cloddy ground. The most stubborn piece of land may, by one or at most two timely operations, be pulverized more completely than by double or treble the number of ploughings. The first application should be made immediately after the land is turned over—that is to say, all land ploughed during the day should be subjected to the operation in the afternoon. When such land comes to be re-ploughed it will always be found in a light and friable condition.

The drag-roller is not recommended for the purpose of being substituted for the common roller, or in any manner superseding it. The respective merits of the implements rest on different basis. The common roller must remain highly useful in giving a smooth surface to land in order to enable the scytheman to harvest the crop with facility. The drag-roller is intended to assist in the preparation of the ground for the reception of seed; and will be found exceedingly beneficial in attaining this object in all spring and summer fallows. When the ploughing has been done in the fall or winter, the action of the frost alone will produce the desired effect. On grass or sward land well turned over, it will aid in smothering such roots or spires as might otherwise grow, by filling the interstices with the loose mould.

The construction of the drag-roller is sufficiently simple. The piece of timber may be about six feet long, and eighteen or twenty inches in diameter, which may be lightened to any extent by taking from the upper side: one-third or even one-half may be hewed off according to the size of the log. Two pieces of scantling introduced obliquely by mortice and tennon at a suitable distance from the ends of the log, and made fast to each other opposite to the middle, completes the fixture, which may be drawn by either horses or oxen. It is desirable to have the diameter of the size recommended, that the implement may pass smoothly over the ground:—if too small, the earth will gather before it, by which the progress will be impeded, and the efficiency of the operation impaired.

T. S. P.

Goochland county, Va., 2 mo. 27.

FLORIDA COFFEE.

From the Augusta Sentinel.

Dear Sir:—The difficulty with which I procured a pamphlet, containing information with regard to the culture of the "Florida coffee," induces me to offer to the public through your paper the following information with regard to this invaluable article.

It should be planted like cotton and at the same time, in any climate where cotton may be cultivated to advantage—on beds five feet apart (for in good land the plant grows from 10 to 12 feet high,) or nearer on poor land. Two pounds of seed will plant an acre which will yield from 1500

to 2000 lbs. coffee: blooms from early in July to November, and ripens from early in August till frost. The grains are about the size of a grain of wheat, but more the shape of the nux vomica; it grows in pods containing from 40 to 60 grains each. It must be gathered as fast as it ripens. Neither horses, hogs, or cattle will eat it; nor is it disturbed by caterpillars or insects. It returns abundant foliage to land—better for bees than buckwheat, as pure honey rises from the plant. It may be cultivated to advantage on land exhausted by the cultivation of corn or cotton, and with low fences, as horses, cattle, or hogs will not eat it.

AMOS W. HAMMOND.

Ruckersville, Ga.

THE INDIAN PEA.

To the Editor of the Farmers' Register.

Among all the various plants of the leguminous kind, known to us southern people, I deem the Indian pea by far the most valuable: and having paid much attention, for many years, to its culture and uses, I have concluded to offer you the result of my observations, as the season for planting them is close at hand. I ought to have said—*the commencement* of the season; for you may begin in April and continue to plant the different varieties until late in June.

Nothing cultivated by us southern farmers and planters, furnishes a stronger proof of the great inconvenience and disadvantage of having many different names for the same plant, than the Indian pea. Every man's experience must have convinced him of this; for there is scarcely a single variety—of which I myself know at least fifteen, that has not two, three, or four different names for it. Hence there is great difficulty in procuring the kind you want, unless you can succeed in a particular description of the pea itself.

It may possibly be a vain attempt to reduce this chaos of names to any thing even approaching to regular order and certainty; but the effort is worth making, if I can succeed only partially. How many varieties of this valuable esculent there may be, I will not venture to affirm; neither will I undertake to give all the names by which I have heard each variety called in particular counties or neighborhoods; for some would have as many "aliases," as the most famous of our swindlersever had. But I believe I can suggest a general term, in the suitability of which, all will concur, that will comprehend at least six of these varieties known to myself. For instance, the term "*crowder*" may be applied with perfect propriety certainly to that number; because its ordinary meaning indicates a peculiar circumstance which distinguishes the whole of them from all the other varieties yet cultivated among us. It is, that they grow so much closer together in the pod, as *to flatten each other at the ends*, and hence, called "*crowders.*" Of course, they contain more peas in a pod of the same length, than any other variety, and are, in general, more productive; although they differ somewhat from each other in this respect. The varieties of the crowder peas which I have seen in cultivation are—the jet black, the white with a black eye, (now very scarce) the gray, the straw colored or sugar-pea, the claret colored, and the yellowish brown. All of these are early peas, except the claret colored; but the last, is earlier not only than any of the crowders, but than any other kind that I have tried. Some, however, think the red and white (not a crowder,) the earliest of all the varieties. All the crowders are good for table use; but the sugar and the gray are generally deemed the best—better in fact, than any, unless perhaps, it may be what we call *the North Carolina pea*, merely because it was introduced among us from that state. It is a white pea with a pale greenish eye, and longer than 'tis thick. The other varieties which I have seen cultivated are—the common black-eyed pea, in such general demand among our sailors. Of this kind, there are two varieties: one much larger, but less productive than the other. In preferring the black-eyed pea, I beg leave to tell our sea-faring people, that they cheat their palates most egregiously; for there are at least four or five better varieties for table use, which might be procured in equal abundance, and equally cheap, if there was a demand for them. The smaller black-eyed pea is very productive; but as an improver of land, it stands at the bottom of the scale, having less vine than any other kind. Another variety is *the ladies' pea*, as some call it, or *the gentleman pea*, as 'tis called by others. It is the smallest I know, except the dark bottle green, and is used only for the table; but is actually the most tasteless of all that I have ever tried. It makes, however, a handsome dish from its peculiar whiteness, and is therefore preferred by those who had rather gratify their eyes than their palates in such matters, which I confess is not my taste. There is another variety differing from that last mentioned, only in size, and in being somewhat longer in proportion to its thickness. The only name which I have ever heard given to this, was, "*the gentleman pea;*" and 'tis well christened, if the term gentleman, according to little Harry Sandford's notion, means something that is good for nothing. Another variety is a white pea with a brown colored eye, which is the only circumstance by which it can be distinguished from the white North Carolina pea already mentioned—*that* having a pale green eye; but in color, size, and shape there is no perceptible difference. I have heard it called, the yohorn—a name by the way, sometimes applied to two other very different varieties. The red and white pea already mentioned, is very early in coming to maturity; but I know of no other remarkable quality that it possesses. Another variety is the well known cow-pea of the Carolinas, by which name it is known in the southern part of Virginia. But in the counties on the Rappahannock, and between that river and the Matapony, it is best known by the name of the Yeatman pea, from the circumstance, (as I have always heard) of a Mr. Yeatman having intoduced it into Matthews county, some thirty odd years ago, from the Eastern Shore of Virginia. It is of a yellowish color, is very productive both in vine and seed, unusually hardy in remaining uninjured by rain, after being ripe, and is equal, for table use, to several of the other varieties. Another kind is the claret colored crowder, which, although already mentioned, deserves a more particular notice, from its possessing all the most valuable qualities of the cow or Yeatman pea, together with such a degree of hardiness that many of them will remain in the

ground all winter, and come up in the following spring. Of this fact I was assured by the North Carolina gentleman who gave them to me. He also stated, that they were deemed more valuable in that state—at least in the eastern part of it, than any other Indian pea: so much so indeed, that in renting out land, it was a common stipulation, that the whole of the corn-land should be planted with these peas, from a general belief, that, if the vines were all left on the ground, it might be cultivated every year, without being impoverished. The qualities ascribed to this pea, belong also to a jet black pea, (not a crowder,) which I have heard called the "*tory pea;*" although why or wherefore, I could never ascertain; for in toryism I have never heard of any thing good, whereas, this black pea seems fully equal to the two last mentioned varieties in all their most estimable properties. I once saw a very small kind of pea, of a bottle green color, when pefectly ripe, and with a black pod about four or five inches long. It was recommended to my father as a fine soup pea; but I cannot recollect whether he ever tried it for that, or any other purpose. He planted them but once, and I never heard of the variety afterwards. This is the pea which I have already noticed, as being smaller than the ladies' pea.

The cow pea or Yeatman—the claret colored crowder, and the tory pea, are later in coming to maturity, than any of the other varieties. Whether they are more productive in peas, I am not sure; but believe that they are so. Of their producing more vine, I am very certain. They are, therefore, greater improvers of the soil where the whole vine is either left on the ground, or ploughed in, as a green dressing, than any other peas. But the whole of the vine at least, must be returned to the land, or it will certainly be impoverished, instead of being improved. Many, I know, entertain the fatuitous belief, that the mere cultivation of the Indian pea will improve land—even where the whole crop is taken off entirely; but it is quite as silly a notion, as that ascribed only to children, of "*eating their cake and having it too;*" for the truth is, that no plant ever yet cultivated by man, can by any conceivable means, enrich the soil where it grew, if every part of it be removed; and accordingly the whole annals of agriculture furnish not a solitary fact to invalidate this assertion. That some crops injure land less than others is universally known, and believed; but the *reason* of the fact, very few comparatively speaking, have taken any trouble to ascertain. Can it be owing to any other cause than that the plants which injure *least*, restore *most* of their own substance to their mother earth, when they are forcibly taken from her? This, you will perhaps say, is speculation. Be it so, and take it for no more than 'tis worth.

But let us return to the Indian pea. As a green dressing for land, I believe it to be much superior to buck-wheat, or to any thing else that we have tried—simply because it will produce a greater quantity of vegetable matter on land of the same quality; and the poorer the land—if deemed worth cultivating at all—the more manifest will this excess of quantity be. If taken off entirely, few crops exhaust land more; but the vine of all the varieties makes an excellent long forage for common work horses, oxen, milch cows, or sheep; indeed, it is fully equal, when well cured, to any other long forage whatever, and superior to many kinds, for every sort of stock, except riding and carriage horses. The curing of the vine is somewhat difficult, as it requires more days' sun than any other plant cured for hay. It may, however, be secured considerably sooner by stacking the vines in alternate layers of some six or seven inches thick, with dry wheat, rye, or oat straw, taking care to sprinkle a little salt on each layer of vines. By this means the dry straw becomes nearly as good forage as the vines themselves. Sheep and cattle are particularly fond of it. Many experienced farmers have assured me, and my own experience confirms their opinion, that the dry peas will fatten a horse, ox, sheep or hog, sooner than Indian corn; but the latter must be given towards the end of the process "*to harden the fat,*" as they style it. As food for man, ninety-nine in a hundred, I believe, prefer the Indian pea to the English. This preference among our negroes is, I think, universal.

I have said nothing of the various modes of culture, because I take it for granted no farmer and planter, where the Indian pea is known at all, can be ignorant of it.

J. M. G.

From the Genesee Farmer.

KEEPING SHEEP.

Sowed three bushels of oats to cut before they are quite ripe, for my sheep; this I have found to be the cheapest and best method to winter sheep, of the many ways that I have tried. The sheep will eat it all clean, straw and all, and with it get grain enough (and that being green, I believe it far better than ripe,) to keep them in good condition. I never had a distempered sheep that was kept in this way. Two good sheaves per day, will last twenty sheep through the winter; some days three sheaves and some but one, viz: when they get to the ground; I have tried it and do know. Now, say five months, 150 days, 300 sheaves, that would make twelve bushels to the hundred; would be thirty-six bushels of oats, and the straw. If any of your correspondents can do better, and with less expense I should be glad to know it.

From the New England Farmer.

KNITTING MACHINE.

Mr. Editor—Allow me to call the attention of the public to a machine for knitting stockings and other knit work, to be seen at the Agricultural Warehouse, No. 52 North Market st. It is a small neat, operating machine by which persons in indigent circumstances, and children may be employed to great advantage, and it opens a good field for the investment of capital. It occupies about a cubic foot and is operated upon by turning a crank, which requires no more power or skill than a common hand organ, except when necessary to widen or narrow, a stitch is dropped or added by hand. The machine does the work of six expert knitters, and is very simple, and does its work with astonishing rapidity and precision. It is superior to the stocking loom, as that requires an apprenticeship to learn to work it, and is not calculated for families, whereas this machine can be worked by any intelligent little girl, after a few minutes instruction. It is capable of knitting

either wool, cotton, silk or linen. The overseers of all public institutions are particularly invited to examine it, as it may be very advantageously employed by them, and is within the means of the poor generally.

[The following is the statement of Mr. John Morehead describing his management of a crop of carrots, for which a premium was awarded to him by the Massachusetts Agricultural Society.

From the New England Farmer.

CARROTS AS A FIELD CROP.

1. The land was planted in corn in 1833, and was in good heart. 2. It has been used as a pasture for more than thirty years; one-half of it was planted without any manure, the other half with a mixture of kelp [sea weed] and common barn yard manure; the product was forty bushels or over; it was hoed in the usual way three times, besides twice ploughing. 3. In the latter part of the winter of 1833, and the first part of the winter of 1834, there was carted seventy-three loads of kelp from the sea shore, besides two loads of barn yard manure, making the whole seventy-five loads for one horse; the loads were about one-half as much as a three cattle team would draw; the distance about one mile; the kelp was laid in small heaps, three to each load, upon a piece of land containing one acre and three rods. 4. The quantity of seed used was a small fraction over three pounds. 5. In the beginning of April, the old corn roots were dug up, the kelp spread, and the land ploughed; it was then hoed across the furrows, as it was not loose enough to receive the seed. Besides, there were some small stones and brier roots taken out. It was harrowed three times with a one horse harrow, then raked, which completed the preparation for sowing. The seed was sown from the 14th to 19th of April. First time of hoeing from 29th of May to the 3d of June; second time from the 20th to the 28th of June; third time from the 19th to the 29th of July.

The seed was sowed in rows thirteen inches apart, and after sowing was rolled with a light roller by hand.

Amount of labor:—

Drawing kelp from the beach, -	$25 00
Drawing out the corn roots and taking them off, - - - - - -	1 00
Ploughing the land, - - - - -	2 00
Hoeing across the furrows and taking out small stones, - - - - - -	5 00
Harrowing and raking it over, - -	2 00
Sowing the seed and rolling, - -	6 00
First hoeing, - - - - - -	6 00
Second hoeing, weeding and throwing out,	10 00
Third hoeing and weeding, - - -	8 00
Harvesting and measuring the whole crop,	25 00
Carrot seed, - - - - - -	3 00
Total, - - - - -	$93 00

Began to harvest carrots Oct. 26, and finished Nov. 8. The carrots were first dug up and laid in rows to dry, then carted to a piece of green sward, separated from the tops and dirt, carefully measured and some of them weighed. The whole amount of carrots was six hundred and forty-five bushels, containing fifty-six lbs. and upwards.

From the Fayetteville, N. C. Observer.

RARE FLOWER.

Perhaps few of our readers are aware of the effects which may be produced on fruits and flowers by what is commonly called budding, or inoculating the limbs of trees. We yesterday saw a flower, from the garden of a gentleman of this county, (who has made many experiments of this kind,) combining the qualities of the rose and peach blossom. The stem and leaf were of the peach, except that the latter was slightly serrated similar to the rose leaf; the leaves of the flower were of the color of the peach, and taste of the rose; the farina resembled that of the peach. The flower was about four times the size of the peach blossom.

From Insect Transformations.

RAFT OF EGGS OF THE GNAT.

The most singular disposal of eggs with which we are acquainted in the economy of insects, is exemplified in the common gnat (*Culex pipiens*, Linn.) It is admirably described by Réaumur, though it seems first to have been discovered by Langallo, who mentions it in a letter addressed to Redi, printed at Florence in 1679; and by Alloa, who actually saw the eggs laid, and afterwards sketched a figure of them. Those who wish to witness this singular operation, must repair before five or six o'clock in the morning to a pond or a bucket of stagnant water frequented by gnats; when Réaumur went later in the day he was always disappointed.

The facts of this disposal of her eggs by the common gnat, are sufficiently curious to excite attention to them; and, therefore, it is not easily to be understood how the following erroneous and fanciful account originated. "The manner," says Goldsmith, "in which the insect lays its eggs is particularly curious; after having laid the proper number on the surface of the water, it surrounds them with a kind of unctuous matter, which prevents them from sinking, but at the same time fastens them with a thread to the bottom, to prevent their floating away, at the mercy of every breeze, from a place the warmth of which is proper for their production, to any other where the water may be too cold, or the animals, its enemies, too numerous. Thus the insects, in their egg state, resemble a buoy which is fixed by an anchor. As they come to maturity, they sink deeper, and at last, when they leave the egg as worms, creep to the bottom."* This fable, which was first mentioned by Pliny, is repeated verbatim by Bingley.† The impossibility of a gnat spinning a thread, and plunging into the water to fix it at the bottom, never struck these writers.

We are the more anxious to expose these erroneous acounts, from the persuasion that a taste for natural history has been more injured by numerous similar statements, which could not be verified by a student, in many popular works, than by the driest skeleton descriptions of those who have merely pursued Natural History as a science of names.

The problem of the gnat is to construct a boat-

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* Goldsmith, Animated Nature, vi. 337.

† Bingley, Animal Biography, iii. 489, 3d ed.

shaped raft, which will float, of eggs heavy enough to sink in water if dropped into it one by one. The eggs are nearly of the pyramidal form of a pocket gunpowder-flask, rather pointed at the under end, with a projection like the mouth of a bottle. The first operation of the mother gnat is to fix herself by the four-legs to the side of a bucket, or upon a floating leaf, with her body level with and resting upon the surface of the water, excepting the last ring of the tail, which is a little raised; she then crosses her two hind legs in form of an X, the inner opening of which is intended to form the scaffolding of her structure. She accordingly brings the inner angle of her crossed legs close to the raised part of her body and places in it an egg, covered, as is usual among insects, with a glutinous fluid. On each side of this egg she places another, all which adhere firmly together by means of their glue, and form a triangular figure thus ⁂, which is the stern of the raft. She proceeds in the same manner to add egg after egg in a vertical (not a horizontal) position, carefully regulating the shape by her crossed legs; and as her raft increases in magnitude, she pushes the whole gradually to a greater distance, and when she has about half-finished, she uncrosses her legs and places them parallel, the angle being no longer necessary for shaping the boat. Each raft consists of from two hundred and fifty to three hundred and fifty eggs, which, when all laid, float on the water secure from sinking, and are finally abandoned by the mother. They are hatched in a few days, the grubs issuing from the lower end; but the boat, now composed of the empty shells, continues to float till it is destroyed by the weather.*

Kirby justly describes this little vessel as resembling a London wherry, being sharp and higher, as sailors say, fore and aft, convex below and concave above, and always floating on its keel. "The most violent agitation of the water," he adds, "cannot sink it, and what is more extraordinary, and a property still a desideratum in our life-boats, though hollow, it never becomes filled with water, even though exposed. To put this to the test, I placed half a dozen of these boats upon the surface of a tumbler half-full of water: I then poured upon them a stream of that element from the mouth of a quart bottle held a foot above them. Yet after this treatment, which was so rough as actually to project one out of the glass, I found them floating as before upon their bottoms, and not a drop of water within their cavity."† We have repeatedly pushed them to the bottom of a glass of water; but they always came up immediately to the surface apparently unwetted.

From the American Rail Road Journal.

AVERY'S ROTARY ENGINE.

In our brief notice of this engine in the last number of the Journal, we omitted to state a very important fact in relation to the construction of its boiler and chimney.

It has been deemed a very important matter, and great efforts have been made, to construct locomotives in such a manner as to avoid the danger arising from sparks from the chimney—with what success others have met, we cannot say; but in this respect Mr. Avery has been eminently successful—as when we were with it, in running near ten miles, not a particle of fire was discovered to issue from the chimney—and we are told that neither fire nor cinders ever annoy passengers, as they never come out of the chimney.

From further experiments and investigation in relation to this engine, we are disposed to *predict* —although no pretensions are made to the gift of prophecy—that a locomotive engine will be constructed upon Avery's plan, within the next six months, which shall make a trip from Jersey City to Newark, and back again to the Ferry, in 45 minutes, with 100 passengers—passing the Bergen Hill, with an elevation of 152 feet to the mile.

ANALYSIS OF THE LEAVES OF THE MULBERRY.

Translated for the Farmers' Register from the *Sommaire des seances de la Societe Royale et Centrale d'Agriculture* of December 1834.

M. D'Arcet (the son) sends a letter upon a chemical analysis which he has made of the leaves of the mulberry. The result of this analysis shows that the mulberry leaf contains four parts in the 100 of azote. It may result from this composition of mulberry leaves, that silk being a product in a high degree supplied with azote, as an ingredient, mulberry leaves for the nourishment of silk worms could not be advantageously substituted except by other leaves which also contain azote. Then, as it is not known whether other leaves contain as much azote, he will, to that end, make the analysis of such other leaves as are considered proper substitutes for mulberry leaves.

M. Chevreul says that the presence of azote has long been known in the leaves of the mulberry, and likewise in the leaves of many other plants: that the difference which is said to exist between animal and vegetable substances, relatively to the presence of azote in the former, has always been faulty—because, that if, in the mass, there existed more azote, proportionally, in an animal than in a vegetable, still there were immediate products of animals which contained very little azote, and even none—while there were immediate products of vegetables which contained much azote—and *vice versa.* It is not then only the analysis of the vegetables which is necessary, according to M. Chevreul, but also the analysis of their immediate products—and especially, to understand well what of the immediate products serve for the nourishment of the silk worm—since it is well known that insects, even more than other animals, have the property of rejecting, among the vegetable substances on which they feed, and almost as they are taken, those parts which cannot serve for their nourishment, and for the preparation of the secretions which the insects yield.

M. Ardouin adds, in support of what M. Chevreul says, that there are many kinds of caterpillars which produce silk, and in as great quantity as the silk worm, and which live on trees which cannot furnish support to the silk worm.

M. Payen says that, according to his own experience, all the vegetables upon which experiments have been made contain azote *dans un principe continu* from the extremities of the roots to the extremities of the leaves—and even in the

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* Réaumur, Mem. iv. p. 621.

† Introd. iii. p. 32.

petals of the flowers, and principally of the stigmas.

CLOVER SOWN ON CORN LAND, WHILE UNDER TILLAGE.

To the Editor of the Farmers' Register.

New York, April 4th, 1835.

Occasionally I have an opportunity of seeing a number of your valuable Farmers' Register, and as I feel a deep interest in the prospect of every thing like improvement in Virginia, (of which state, it is with feelings of pride I claim to be a native,) I cannot but add my humble mite—the result of a conversation held a short time since with a New Jersey farmer.

In conversing with him upon the subject of agriculture as practised in Virginia, I remarked that I was but little acquainted with it either theoretically or practically; but the information I had, was derived almost entirely from the perusal of a number published in your Register and contributed by Hill Carter, Esq. of Shirley, upon the management of his estate generally, and the subject of a rotation of crops. This I endeavored to explain to him in the best manner I could, and believe I made myself understood.

He replied that he had practised the four-shift system, but had latterly adopted a more extended method—dividing his farm into some six or seven fields I think, and practising a proper system of rotation with the benefit of clover.

But upon the use of clover he said he thought he could impart to me a valuable secret. It was a discovery made by himself, had been adopted by his immediate neighbors, and they had all pronounced it in a high degree successful.

He stated it was his custom, immediately after ploughing through his corn a second time, (to weed it,) and after it had attained something like a foot in height, to sow clover seed in amongst it. That the clover would spring up too late to offer any obstruction to the corn, and it would answer the double purpose of not only shielding the earth from the impoverishing heat of the sun, but of also cleansing the field from all noxious weeds. The corn then matures—it is gathered in due season—and then says he, I turn my cattle in upon the clover; or let the field lie as I may think proper. The fall comes, and I plough my field up, and have a fine clover fallow upon which to sow what is usually denominated the corn ground wheat.

The remark struck me, with my limited knowledge of agriculture, as being practicable, and now that the season approaches when it may be tried, or improved upon, I have taken the liberty to communicate it. It can at least do no harm to try the experiment, and if successful, it will always be a source of gratification to me to know that I have suggested any thing, however trifling, that can redound to the advancement of the good "Old Dominion."

W. H. H.

For the Farmers' Register.

VEGETABLE AND MINERAL INTELLIGENCE.

From a variety of experiments made on vegetables, many naturalists are of opinion they possess mind. It is asserted that the common hop, *(Humulus Lupulus,)* directs its course to the nearest perpendicular object; as if it were assured of the great danger to which it would be exposed by extending its branches on the surface of the earth. The *Euscreta*, American dodder, or love vine, entwines a number of small plants in moist places. The seed is deposited in the earth, and in a short time begins to vegetate—a vine puts up which seizes the first plant it reaches. This plant affords it nourishment—the communication between the earth and dodder is now cut off, and it is dependent on various vegetables for support. If the plant around which the dodder clings becomes unhealthy or dies, the dodder is said to desert it for a better friend. The spiral direction of vines in climbing perpendicular objects seems to be a strong argument in favor of some intelligence, for when they creep horizontally, this is not observed. In climbing objects vegetables have to oppose gravity, and unless they secure themselves by winding round their support, they must necessarily fall to the ground. The cow itch, *(Dolichos Pruriens,)* climbs erect objects, without winding round their support; but it is prevented from falling by a number of radicles that attach themselves to the object. All plants become languid when deprived of light; but if a small hole be made in their apartments, so as to admit light, they find they way to it and creep out as if they were tired of their confinement, and pleased in looking around and contemplating the great variety of objects that present themselves.

The sexual intercourse of vegetables is well known, for it is ascertained that a powder (or pollen) secreted upon the anthers is necessary to render the young seed fruitful: without the male influence, seed cannot ripen or mature.

Venus' fly trap, *(Dionea muscipula,)* deserves notice. The leaf is shaped like a shoe or slipper, the edges of which are notched in such a manner as to form a very singular apparatus. The leaf being very sensitive, when a fly or any insect lights upon it, the leaf closes and confines the object. It is asserted by Mr. Buffon, that the roots of plants will creep aside to avoid bad earth, or to approach good.

Dr. Darwin assures us plants are very particular in selecting their food, though they sometimes, like animals, take in poisonous substances, producing disease and death.

Dr. Hales put the stem of an apple tree in strong brandy: in a short time the stem became intoxicated and died.

When any part of the sensitive plant is touched it falls, which would seem to prove that the plant possesses a sensorium, or brain.

Many of the gossiping female flowers are known to be guilty of adultery by deserting their husbands and kissing other males or *stamens.*

If vegetables did not possess organs of sense, could they be so completely under the influence of heat and cold, moisture and dryness, light and darkness? We know they have life, motion and sensation, and do they not possess mind? If so, is it not probable that minerals and crude matter possess it in some degree? It seems absurd, because philosophy has not yet extended her researches far enough to ascertain the truth of this observation. Is it reasonable to suppose that God has created any thing without intelligence? Has he not given intelligence to the whole globe itself, which is more or less observable according to a

due arrangement of its parts? May not mineral matter possess mind in the lowest degree, and organized matter possess it in the highest degree? These are questions I would respectfully ask, if I could meet with a phhilosoper who could answer them. Minerals are formed spontaneously by virtue of their affinities: animals and vegetables require seed or eggs, so organized as to possess vitality and irritability. But may not mineral productions have properties in common with vegetable and animal? It is well known that minerals are capable of assuming and retaining certain forms, which forms they will observe in spite of the powers of repulsion. The *nitrate of potash*, (salt petre,) crystalizes in prismatic *octahedrous;* and by virtue of certain characteristic qualities of this and other salts, which they originally possessed, they invariably assume the same forms and appearance. The arrangement, disposition, and order observable in the mineral kingdom, must be as much admired, as that which forms the admirable and exquisite texture of the organic world; for they are both the result of certain attractions and motions, which the constituent parts take in their formation. Naturalists speak in very extravagant terms of the polish and refinement of organic matter; but let them examine minutely the mineral kingdom, and they will find as much order, design, just arrangement, delicate workmanship, regular figure, beauty, variegated color, and in every respect, sublimity and grandeur, rivalling in a very eminent degree, the vegetable and animal world. Let us then, appreciate the value of matter, and say the mineral, vegetable and animal kingdoms all possess mind; that the whole ball taken collectively, is a spiritual mass or portion of divinity, which is to undergo certain forms and then return from whence it came. "All the choir of heaven and furniture of the earth, all which compose the mighty frame of the world, hath not any substance without a mind." If this be the case, mind, like matter, is capable of division; it can be divided and sub-divided into a number of parts, which may exist in a variety of matter, giving it intelligence; and must possess solidity, extension, figure, and continually going the round of circulation, as is the case with matter, and governed by the general laws of gravity and attraction. When disengaged from one portion of matter, it may get possession of another, and thus produce perception in other matter prepared to receive it.

It is well known that mind and matter exist, and that they act and react upon each other: and from this reciprocal action and reaction, arise all ideas and sensations. It is also known, that when an injury is done to the brain, the mind suffers; and if the injury be very great, the mind deserts its habitation never to return. What becomes of it? Does it take its flight to another world; or does it go in search of matter prepared to receive it, and get a new habitation? Mind is matter disengaged from the brain, and of course, material. But here a very important question arises: can any thing like materiality exist, when God is immaterial? He has been pleased to call matter into existence, and is it reasonable to suppose any thing he has created can perish? We speak of the affairs of this world in a temporal point of view, but the wise disposer of the universe, views them in a spiritual point of view: and has created every thing for wise purposes. It is the duty of man, therefore, to set the highest value on the works of Deity; for the mineral, vegetable and animal kingdoms, have high claims to immateriality. Indeed, matter, strictly speaking, can be nothing but an immaterial essence or spiritual mass of God's creation. He governs it; he exists in it, and he is every where!! If a single blade of grass was this moment annihilated, there would probably be a link in the universal chain destroyed, which would not only produce confusion in this earth, but would convulse all the planetary worlds! Nay, if the smallest grain of sand was removed from existence, it might affect the projectile force of the earth, and not only bring it in collision with the sun, but derange the whole starry heavens and all the systems and worlds that lie retired beyond our limits and comprehension.

GALEN.

[The writer of the foregoing piece, shows in it more power of imagination than adherence to strict reasoning. Nevertheless, his facts are interesting, and his deductions and arguments may amuse those whom they cannot convince.]

For the Farmers' Regster.

ORCHARDS IN ALTERNATE ROWS, OR QUINCUNX ORDER.

Xenophon thus describes the gallant plantation of Cyrus at Sardis, as rendered by Cicero: "Arbores pari intervallo sitas, rectos ordines et omnia per puchre in Quincuncum directa"—that is, rows and orders so handsomely disposed or five trees so set together, that a regular angularity, and thorough prospect, was left on every side, owing this name to the "Quintuple number of trees," as thus figured, viz:

"That the same was used in later plantations, is plainly confirmed from the commanding pen of Varro, Quintilian, and handsome description of Virgil, in his second Georgic. See the garden of Cyrus, &c., by Sir Thomas Brown, of Norwich, M. D."

S.

From Silliman's Journal 1824.

WOOL MORE ABUNDANT IN COLD CLIMATES.

"From their elevation and latitude, the grazing lands situated in the northern part of New England, are best adapted for sheep. The great consumption of fodder incident to long winters, so objectionable to the raising of cattle, is more than compensated to the merino sheep proprietor, by an

improvement in the quantity and quality of wool, which is much affected by climate. In tropical countries, sheep are *dressed* with hair—in more temperate, the wool is generally short and coarse, but longer and finer in cold regions. In Spain, two and a half pounds of wool is the average product of their merinos, and of a quality inferior to ours—in the middle states, and valley of the Hudson, the same; on the elevated ground in the western part of Connecticut and Massachusetts—three, and in some flocks, four pounds. In the southern and middle part of Vermont, from four to four and a half. In Maine the average is five; and in a few choice flocks, six pounds the sheep. The best merino wool of Europe, is from the bleak mountains of Saxony. The quantity and quality of wool is also considerably affected by the food, management and selection of flocks, as nature bountifully provides a dress for all animals according to their wants. Furs are found to be good, and the staple long, in proportion to coldness of climate.

"The northern parts of the United States and Canada, in addition to climate, have for the raising of wool, an important advantage over England, and the south of Europe, in cheapness of soil—much land being required for the support of sheep. The fee simple of good sheep farms in America, can be procured with the amount of the annual rent and taxes of the same quality of ground in England."

From the Athenæum.

RISE OF THE COTTON MANUFACTURE IN ENGLAND.

In the beginning of the reign of George III., (1760,) this trade gave employment to 40,000 persons, and the value of the goods produced was £600,000. It now employs not less than 1,500,000 persons, and the value of the goods produced exceeds thirty-one millions. The cotton yarn annually spun in England would, in a single thread, girdle the globe 203,775 times, it would reach 51 times from the earth to the sun, and it would encircle the earth's orbit eight times and a half.

From the London Morning Chronicle.

HEAT WITHOUT FIRE.

When the properties of steam and its power were first ascertained, it was supposed that human genius could extend no further, still since then we have had our streets and houses lighted by gas, and now we are to have our residences warmed and our provision dressed without the use of "fire, flame, smoke, steam, gas, oil, spirit, chemical preparation, or any dangerous substance whatever." Incredible as this may appear, it is no less true, an ingenious German having invented a machine by which it may be accomplished. It is made of brass, is about 22 inches high, 12 inches wide, and six deep, has the appearance of a miniature chest of drawers, and is surrounded by an inverted crescent, which is hollow for the purpose of containing water. It is called "Wenn's solar stove," and is heated by "elementary heat," produced (according to the words of the inventor) by 'separate and combined elements.' It may be used with the greatest safety in ships, and in manufactories and warehouses, where, in consequence of the combustible nature of the stock, fires are prohibited. The process of heating is so clean and simple, that a lady with white gloves on may perform it without soiling them, or a child three years of age without injury.

Yesterday its powers were exhibited at the West India docks, before Capt. Parish, the dock master, T. Shelrake, Esq. engineer, ——— Beck, Esq., and a number of other gentlemen connected with the dock company, who expressed the greatest astonishment at Mr. Wenn's invaluable discovery, and said they considered it would be of incalculable service to the navy, &c. Heat was produced by invisible means in less than two minutes, and in three minutes afterwards, water which had been put into the crescent, boiled with such force, that the window of the room in which it was tried was compelled to be opened to let the steam escape. There is a drawer in the machine in which a steak or chop can be cooked in its own gravy, but there not being one at hand, the experiment was not tried. Three hours after it had been heated, from which time nothing had been done to it, it was found to be still so hot that it could scarcely be touched with the naked hand, although it had been carried from the docks to the city. We understand it is the intention of the ingenious inventor, who has expended all he was possessed of in bringing it to perfection, to exhibit it to the public at the museum of arts and sciences, in Leicester square.

From the Library of Useful Knowledge, Farmer's Series.

THE SHETLAND HORSE.

The *Shetland Pony*, called in Scotland *Sheltie*, an inhabitant of the extremest northern Scottish isles, is a very diminutive animal, sometimes not seven hands and a half in height, and rarely exceeding nine and a half. He is often exceedingly beautiful, with a small head, good-tempered countenance, a short neck, fine towards the throttle, shoulders low and thick, (in so little a creature far from being a blemish,) back short, quarters expanded and powerful, legs flat and fine, and pretty round feet. They possess immense strength for their size, will fatten upon any thing; and are perfectly docile. One of them nine hands, or three feet in height, carried a man of twelve stone, forty miles in one day.

A friend of ours was, not long ago, presented with one of these elegant little animals. He was several miles from home, and puzzled how to convey his newly-acquired property. The Shetlander was scarcely more than seven hands high, and as docile as he was beautiful. "Can we not carry him in your chaise?" said his friend. The strange experiment was tried. The Sheltie was placed in the bottom of the gig, and covered up as well as could be managed with the apron; a few bits of bread kept him quiet; and thus he was safely conveyed away, and exhibited the curious spectacle of a horse riding in a gig.

In the southern parts of the kingdom the Shetlanders have a very pleasing appearance, harnessed to a light garden chair, or carrying an almost baby rider. There are several of them now running in Windsor Park.

It has been disputed whether the pony and large English horse were, or could be, originally from the same stock. The question is difficult to answer. It is not impossible that they might have

one common extraction, and, if we reflect on the effect of feeding, it is not so improbable as it may at first appear.

Mr. Parkinson* relates a circumstance very much to the point, that fell under his observation. His father had a mare that brought him no less than fourteen colts, and all by the same horse, and not one of which at three years old was under seventeen hands. She was in the fifteenth foal by the same horse, when he sold her to a neighboring farmer, reserving the foal which was to be delivered in a twelvemonth. At her new master's she was comparatively starved, and she came back at the expiration of the year so altered as scarcely to be recognized. The foal, four months old, was very small. The little animal was put on the most luxuriant keep, but it did not reach more than fifteen hands at the expiration of the third year.

[Much space has been occupied of late in the British agricultural periodicals by articles on the remarkable and extensive failures in the potato crop. The following is the latest that has been received. We are so ignorant of this culture on a large scale, as not to know whether such diseases as are described, and the consequent losses, have ever been experienced in the United States. But even if not, and the principal value of the following statements should be therefore useless, there will still be found facts and opinions which will be novel and interesting to many.]

From the British Farmer's Magazine.

ON THE RECENT FAILURES IN THE POTATO CROP, AND THE PROBABILITY THAT A PREVENTIVE HAS BEEN DISCOVERED.

By Mr. Peter Cowan, farm overseer, Antrim Castle.

The immense variety of the potato in Ireland is something surprising, seeing that the painstaking and patience-requiring endeavor to raise new sorts from seed, is rarely if ever practised by our farmers. It is probable that there are at least two hundred distinct varieties in cultivation in this kingdom—the kinds grown in one county, being, in many instances, totally unknown in the adjoining one. The distinction in the quality of each variety is also surprising. All the black or dark blue skinned sorts are found to contain more farina than the white colored ones, and housewives always choose the former for making potato-starch. The red skinned sorts also contain a great portion of farina at a certain season of the year. Some kinds when raised in November are so watery and strong tasted, as to be unfit for use at that season, and continue so until the following spring, when their quality becomes totally changed; they are then mild, mealy, and excellent, and so continue through the summer months. Other kinds are in high perfection when dug out in October and November, preserve their good qualities through winter, but become unfit for use towards the month of April. Some sorts are excellent in autumn, cease to be so through winter, but resume their excellence on the approach of spring. In general, the white skinned sorts are fit for the table from August to Christmas—the black skinned sorts from October to May—the red skinned sorts from May or June to August. Such a variety in the quality of this root enables families in this country to have good potatoes on their tables every day in the year; a great advantage certainly, but one, the interruption of which has been seriously threatened by the failure in the seed roots of the last and those of the present year. On uncovering a barren drill last season, some of the sets were found quite rotten, while others were perfectly sound, but unnaturally hard. In some of the latter the buds had advanced an inch or two, but, instead of continuing to grow in a regular manner, a small tuber had formed at the end, and the growth of the shoot being thus obstructed, another puny one was seen stealing from the same eye. Some sets, after being in the ground for six weeks, were just making an effort, as it were, to strike. Some had sprung a few inches, but, instead of taking an upright direction, they grew round the set, and were hard and wiry, resembling more the root of a young tree, than a young succulent potato stem. These appearances implied a want of vigor in the bud, consequent upon a morbid state of the juices of it, and of the part of the tuber or set from which it sprung, which led to the supposition that the fountain from which the bud first derived its nourishment, namely, this tuber or set itself, must have been a poisoned one; but how it became so, and over such an extent of country, it was not so easy to say. This year a more general rot took place in the sets, and fewer of them produced weakly plants, and, on this account, the appearance of the growing crop has all along been much better than it was last year.

The cause or causes of this failure have not been satisfactorily ascertained: nothing, however, has arisen to invalidate, but much to confirm, the opinion which I ventured to express last season, viz., that it was caused by atmospheric influence affecting the set through the cut part of it. Among many causes which have been assigned, one or two may be noticed with a view of showing their fallacy.

And first, it appears to me to be perfectly clear, that the failures cannot be attributed to any management of the potatoes when out of the ground, as in the housing or pitting processes, &c., since, in this country at least, that management has not, during the last two years, differed in any respect from what has been customary during the last twenty years. Were any disease contracted by the means used for preserving the roots through winter, would it not show itself in the whole potato, as well as in the cut set? It would unquestionably. But it does not; it is only when the potatoes are cut into sets* that the evil is to be apprehended.

The failure is caused, say some, by the potatoes from which seed is taken being unripened. Now, nothing could be more unlikely than this; for, whatever theorists have said, or may say, practical men know, that unripened, and, consequently, watery potatoes, make the best seed-roots, inasmuch as they always produce the most healthy

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* Parkinson on Breeding, and the Management of Live Stock, vol. ii. p. 139.

* Has not the practice of cutting also prevailed previously to the last two years? If so, this objection, in great measure, falls to the ground.—Conductor.

and the most vigorous plants, this watery matter being the germinative principle; and, therefore it is that farmers resort to mossy ground, or to the hills, for their seed; and, it is by acting on this principle, that market gardeners and nurserymen are enabled to preserve their select kinds of potatoes free from degeneracy. When intended for seed, for themselves or others, they plant them late in the season, or they dig them early in the season; in either case the tubers are not matured, they are watery, the farina has not been developed, and in this way they continue to raise great crops of the same kinds of potatoes on the same ground, year after year. On the other hand, we know that if we choose and use for seed, those potatoes which have grown in good land, have fully ripened there, and which, consequently, contain the greatest proportion of farina, and the least of water, many of the plants will be curled, a general want of vigor will be evident, and the produce will be far inferior to that from watery unripened roots. Indeed, so long ago as 1811, that acute observer and eminent practical agriculturist, the late Mr. Brown, of Markle, N. B., speaking of the curl in potatoes, observes, (see his "Rural Affairs," 2 vols.,) that:—"it appears to be occasioned by an over-ripeness of the plant, whereby its strength or procreative power is so much debilitated as to render it unable to bring forward a healthy plant afterwards." This is farther illustrated and confirmed by the fact, known to all persons engaged in rural affairs, that the rose-end—particularly in the long, flat, kidney-shaped varieties—the rose-end, comprising a fourth or fifth part of the potato, makes better seed than any other part of the root. Boil these potatoes, however, and it will be found that this rose-end, which would make such good seed, is so soft and watery as to be sometimes uneatable, while the rest of the potato is firm, dry, and floury.

As little likely to gain credence among practical men, is the assertion, that the failures have been caused by the attacks of worms, slugs, maggots, or animalculæ. Some people on examining their "missed" ground, found the potato sets had become a rotten, pulpy mass, and the abode of maggots, and thus imagined that they had discovered the cause of the failure, but, as with all putrid substances, this was the effect, not the cause. A potato set may be "riddled," in country phrase, or eaten through and through by slugs, without, in the least degree, affecting the growth of the bud, and this we have frequently an opportunity of witnessing in those sorts of potatoes which are dug early in the season; the tops shall be strong and vigorous, and a good crop of tubers, while attached to the root is often seen the old set which has scarcely begun to decay, though eaten full of holes by slugs, worms, and maggots. If, after depositing the set in the ground, the bud starts from it vigorously, it soon forms its own roots, and as soon becomes altogether independent of the set, which then gradually decays; but never until the plant is established, unless it be affected by other influences.

Another doctrine, lately advanced by Professor Rennie, of King's College. London, is the following:—"it appears to me," says this gentleman, "that paring and burning would be the most important measure which could be adopted in Ireland for purifying the soil, now so overloaded with potato excretions, that extensive failures in the crop are not uncommon."* This theory, however, is at once upset by the fact, that in the gardens of the poor, where potatoes have been grown every year for scores of years, there has scarcely been a failure, certainly not one for ten which have occurred in fields where several crops intervene between two of potatoes. Were the excrementitious exudations from the roots of previous crops of potatoes the cause of the late failures, it would first show itself, and to a greater proportionate extent, in such places as the gardens just referred to, whereas the very reverse of this is the fact. If I am asked how I account for the failures being less in gardens than in fields, I answer—the cottager generally plants his seed as he cuts them, or if he cuts them on one evening, after his day's work is over for his employer, he plants them the next; the ground of his garden, moreover, is generally well dug and pulverized, and this leads me to state a few facts which appear to be confirmatory of the opinion that the failure has been caused by atmospheric influence.

First. When sets have been cut and planted immediately, or "hot from the knife," they have seldom failed, particularly if the cut surface has been turned downwards, and if the second and third precautions have been rigidly observed; but when the sets have lain unplanted and exposed to the air for a week or ten days after being cut, the failures have been greater. Second. When the ground has been properly prepared, that is, pulverized and rendered fine, as it ought to be, and the drills rolled, the failures have been less than in badly prepared, coarse, lumpy, open, rough ground; in the latter case, the air was freely admitted, in the former it was excluded; hence the great extent of the failure in heavy clay lands. Third. When the dung was properly decomposed when applied to the ground, so that the covering earth lay close to the set and excluded the air, the failures have been fewer than where the dung, by being green and littery, kept the ground open and admitted the air. Fourth. When the surface of the cut of the set has been covered with some material which excluded the atmospheric air, the sets have grown, although they remained unplanted for a considerable time after being so operated on, but those sets which were not treated in this manner, entirely failed.

I was led to make a number of experiments this season with a view of discovering a preventive, but that just stated is the only one which has been attended with complete success. Recollecting that whole potatoes do not fail, I bethought me of making the sets equal to whole ones, by putting a skin of some sort on that part of the set which was bare; this I effected completely and quickly by a little floured lime. I collected a quantity of middle sized potatoes, and set a careful man to work, who cut each potato into two, cutting through the rose end; he had a little floured lime before him, (it was quite cold, having been some days slacked,) into which he pressed the cut surface of the sets before he laid them (the sets) out of his hand; when limed in this way they were put to one side. I found that a sufficiency of lime adhered to the moist surface of the cut, to form, when dry, a cake over it, about the sixteenth part

* Quarterly Journal of Agriculture No. xxv., p. 23.

of an inch in thickness, which seemed to exclude the air completely. Four bushels of sets were so treated. Other four bushels of the same potatoes were cut on the same day, but not limed, and both parcels lay on the floor of an open shed for eighteen days afterwards; they were then planted. The result appears to be worthy of observation. It was this. *Among the limed sets there was scarcely a failure—among the unlimed sets there was scarcely a plant*, and the ground had to be sown with turnips. I did not take any note of the quantity of lime used, or of the additional time required to lime the sets, both being so very inconsiderable, that even on a large scale the extra expense would be trifling. The kind of potato with which the experiments were made was the black seedling.

I stated, in the commencement of this paper, that the red skinned sorts of potatoes contain a great proportion of farina at a certain season of the year; this season is included in the months of May, June, and July, and upon the principle formerly laid down as to what is the germinative property, it will be easy to account for the greater failure which, it is known, has taken place among the red sorts of potatoes, than among any of the black or white varieties. The red rose, a kind much in use in this part of the country, failed to a great extent. This sort is excellent during the three months named; it is then extremely firm and floury on the dish, more so than at any other season of the year. This very circumstance, however, operates against this kind producing vigorous plants, because, when there is little watery matter present, but much farinaceous matter, as we have seen is the case with these red sorts, and exactly at the season of planting, (May,) the plants produced are necessarily weak, because the stimulus to germinative action, if I may so speak, does not exist. Hence, in the most favorable seasons and situations, we find these red roses always producing weak plants at first, although they become stronger as the roots extend. It is easy to conceive, therefore, that if sets of this variety, unprotected on their cut surfaces, were exposed for a considerable time to a dry atmosphere, the little watery matter which they contain would soon evaporate, and the germinative principle become totally inert. When failures in this variety were taking place all around me this season, I procured one bushel of them, cut them, and limed the cut surfaces—planted them, and *not a single one failed.* They may be seen at any time. I must here mention, however, that in cutting them I found so little moisture on the cut surface, that the lime would scarcely adhere, but there being fine mortar at hand, I put some upon a slate and rubbed the cut surfaces on it; this formed an excellent skin when dry, and was attended with complete success, as above stated.

Whether, therefore, the failures be or be not caused by atmospheric influence—for I hope it will be observed that I do not assert they are—I make no assertions; I use the words "if"—"opinion"—"probability," &c. Whether, I say, the failures be or be not caused by atmospheric influence, there appear to me to be three methods of prevention, either of which may, I think, be adopted with success; and on this head I can speak with confidence. Presuming, always, that the land has been properly wrought and pulverized, and the manure sufficiently decomposed—one method is, to plant whole potatoes, but it is certainly an extravagant one—if cut, to plant immediately afterwards, turning the cut side downwards—or, if not planted immediately, to use lime on the moist cut surfaces, in the manner described, which has been attended here with extraordinary and decided success, and is a practice I would strongly recommend, where circumstances render immediate planting impracticable; in this case the lime prevents the escape of the watery matter, and preserves the set fresh and vigorous for weeks. But when immediate planting can be adopted, and the land thoroughly prepared, liming is, perhaps, unnecessary.

CHOOSING SHEEP FOR BREEDING.

One of the two species of sheep, the long and the short wooled, having been chosen, as most appropriate to the situation, and wool being made an object, it is most advantageous to select such flocks as are pure as possible of the species to which they belong, and not a mixture of the short and long wooled breeds, which must generally produce an inferior fleece, disadvantageous to the manufacturer. Length of staple in the long, and fineness, elasticity and closeness in the short wooled fleece, will be the best guides in this case.

Whether the wool be long or short, the carcass of the animal ought to be amply and regularly covered; it is a great defect when the belly is bare, and a still greater when the wool is thin and open along the ridge of the back, admitting rain and moisture to a most susceptible part, indeed to descend upon all parts of the body.

It is a piece of good old advice to buy your *rams* a little before shearing time, if possible; and a very necessary modern addition to take the opportunity of purchasing at the farmer's house while you can see the animal in *puris naturalibus*, and before he has been decked out and trimmed for show by the sheep barber. A thick fleece, covering all parts with as much equality as possible, containing plenty of *yolk*, or retained or inspissated perspiration, is the object. If ewes, equally well bred, can be procured, the shepherd anticipates and reaps an immediate benefit; if not, he must patiently await improvement of his wool, through the medium of the superior blood of his rams.

At *shearing time*, examine the bottoms of the fleece, or the lower extremity of the filaments of wool; if it be *stichy-haired*, of mixed quality, or if the sheep have a coarse breech, or be not well covered, it must be rejected, as improper for a breeding stock, where it would perpetuate its defects. The quantity of yolk or grease is a good proof of the thickness of the fleece, since, by the closeness and thickness of the wool, the grease or perspirable matter of the animal is retained; hence fine, closed, curled wool has ever the greatest quantity of yolk. —*Bath Memoirs.*

From Waldie's Port Folio.

NATURAL GAS WORKS.

A most remarkable fact is stated by the Abbe Imbert, who visited China a few years since. By means of tunnels of bamboo, placed in communication with fountains of carbonated hydrogen in the bowels of the earth, as many as three hundred

cauldrons are supplied with heat for boiling. Streets, halls, work-shops, are all lighted by this gas, which is the same used in all artificial gas works. Arago says that *several villages* in the United States have long been supplied in this manner. This expression is a little too strong, though it is true, we believe in respect to Fredonia, on Lake Erie, where the light-house is also supplied in this way from natural sources. In Ontario county, near Cacandagut, there are also several of these gaseous emissions from the surface of the earth. They are called, in common parlance, "Burning Springs."

For the Farmers' Register.

AGRICULTURAL PROSPECTS OF VIRGINIA.

In viewing the effects of the system of agriculture pursued in eastern Virginia, the most careless observer will be struck with surprise, in comparing the small proportion of land in actual cultivation, with that which is lying waste and unimproved: and it will be increased still more when he reflects how small a part of the farm is regularly manured and kept in good condition, and fit for tillage. None of the farms afford manure enough to replace the produce taken from the fields, and keep them constantly increasing in fertility. The small quantity which is saved from the stable, farm pen, and other sources being insufficient for the farm, is generally applied to the tobacco lots, or some favorite spot, while the rest of the farm is neglected, though perhaps regularly cultivated and grazed, or permitted to lie waste, yielding nothing but a scanty subsistence to a few half-starved cattle. The fences being thrown down, it soon becomes common pasturage, gullied, or grown up in pine barrens; its owner is restricted to a narrower limit in his system of exhaustion and destruction, until, becoming too much confined, or too much indebted, he sells out, and removes to a more fertile and cheaper soil in the west. Thousands are travelling the same road urged by the same causes. The educated, active, and enterprising young men, despairing of success with this example before them, are leaving the state very rapidly, to seek their fortunes in the west and south; and besides all this, the traders are carrying off our slaves in great numbers, and thus annually diminishing in the ratio of the numbers carried off, the quantity of produce which would otherwise be made, and the prosperity of the country. The tide of emigration is regularly increasing from all classes; as if the angel of desolation had cursed the land, and imbued the people with a hatred to the place of their nativity. Even national pride will not make us dispute the facts, however much the patriot and philanthropist may lament their existence. I propose to inquire what causes led to this prostrated condition of agriculture; and whether they will probably be permanent, or are they merely temporary—and to suggest some remedies for existing evils.

The present exhausted state of the country has been generally ascribed to the employment of *slave labor;* which, it is said, will always arrest the progress of improvement, because the slaves have not the capacity, nor do they feel interested to become skilful in their occupation. But the slovenly and negligent management visible on most farms need not necessarily belong to the state of slavery existing among us, as is proved by the high state of cultivation of the lands on James river, and in various small sections of almost every county in eastern Virginia. There is scarcely a person who is not acquainted with some farms cultivated to the very best advantage; and these exceptions prove that bad management, though a general, is not a necessary attendant upon the employment of slave labor. It can, therefore, offer no material obstruction to improved and successful cultivation.

The progress of rapid improvement has been opposed by that attachment to old customs, and disinclination to change old plans, which are almost as strong feelings with us as in those countries where it was regarded and punished as sacrilege, to depart from the occupation of their fathers. The first settlers of our state exhausted one piece of ground by continual cropping, then cleared and tended another piece of fresh land; and when that was exhausted, proceeded to a third. They preferred this, to raising manure, when land could be purchased for a few shillings per acre, and perhaps it was the cheapest course. Yet when lands have risen in value, and there is no reason to justify the same system of husbandry, it still prevails in many places, and is followed, "because their fathers made money in that way." The west, however, is now their resort, after ruining one piece of land by this destructive course.

In a republican government, where the highest offices are within the reach of superior talents and acquirements, the genius and talents of the country will be naturally directed to politics or some of the liberal professions. The undeserved success of some, possessing humble abilities, and the vanity of others, induce many to pursue these professions; and almost every farmer who has educated his son liberally, sends him to "study the law"—where there are more than twenty chances to one, against the probability of his success; and the prospects of failure and disgrace exactly in the reverse ratio. He hangs on at the bar for several years, perhaps idle, dissipated, and a nuisance to society; leaves it disheartened, and in debt—unfitted for the pursuit of agriculture, and too proud to enter into business. If he succeeds, honor makes the greater part of his reward, and his profit comes in slowly at the latter part of his life. In agriculture, his success would have been certain; but his father thinks his education must not be lost upon him—and prefers to hold him up to public contempt, than bury him in the obscurity of a farm. Whether he has natural abilities, or the requisite acquirements; even if nature has manifestly fashioned him for other pursuits, by giving him a strong body and a weak head, still he is destined, from his cradle to "study the law." Hence, the greater part of the education and talents have been diverted from this employment, and directed to some of the liberal professions, which has retarded the improvement of agriculture; latterly, however, many of our distinguished and highly gifted citizens are giving it their attention.

These prejudices are more easily overcome than those unavoidable obstructions, which in the nature of things, oppose the introduction of an improved system. Some capital must be expended in order to commence, as both labor and capital are as necessary in the rapid improvement of exhausted lands, as in the rebuilding of dilapidated houses. 'Tis true, in the progress of time, re-

quiring longer and longer periods, as the land is more and more exhausted, that land will become comparatively fertile by its own inherent recuperative powers; but this process is slow, frequently exceeding half a century.

To attempt improving with the hope of success, the fields must be laid off into separate shifts, drained, clovered and plastered, if the nature of the soil is suitable, and the manure collected and saved by great labor and attention.

Most of our farmers are in debt, and compelled to have immediate returns for the discharge of those debts; all of their available labor and funds must be applied to that end; and to effect it, they are forced to cultivate the richest spots, which yield the greatest profit—leaving out the poorest shifts that produce little or no nett income to pay off pressing demands. They are not able to spend their money in purchasing clover seed and plaster, nor their labor, in manuring the poor shifts, draining, enclosing, and reducing the farm to a proper state. They must overcome these difficulties by a long course of economy and industry.

Besides these natural difficulties, which are incident to the cultivation of every country, there is one which is peculiar to our own state, and has generally been overlooked. I refer to the demand for slaves in the west and south, which materially affects the prosperity of our own state. It has been generally supposed that this demand, by raising their price in our own market, would be highly advantageous to the country: and it would undoubtedly be so, if there were a superabundance of slaves for the cultivation of the whole of our lands, and a consequent overplus of labor after the highest state of improvement. In such a state of things, which could not have occurred in the course of half a century, and probably never would, the most fertile lands must have risen so high, that it would be an object to cultivate and improve those of a poorer quality, until a denser population and a constantly increasing demand would compensate the farmer for the improvement of the poorest soils. The greater the quantity of produce annually made in any country, the greater must be its profits, and consequently, its prosperity; and the greater the quantity of labor which it can command or is employed in it, the greater must be that produce. Hence, whatever detracts from this quantity of labor, equally reduces the prosperity of the country, unless it is overstocked with population. In this view then, it must be prejudicial to the interests of the country to carry into another state its laboring population.

But regard it in another aspect. It is well known to every person, that the greater fertility of the soils in the west and south, their suitability to the production of cotton and sugar will always enable the farmers of those sections to give a higher price for negroes, than the farmers of our own state—for the simple and obvious reason, that they can make larger profits from the produce of their labor. These profits, other things being equal, are almost always greatest in newly settled countries; and are here greatly increased by the superior fertility of the soil, and the enhanced value of its productions. So much larger are the profits of slave labor there, that they sell for nearly double the price which we can afford to give for them.—The effect of this is already plainly perceptible; our slaves are carried there by thousands, and we cannot even enter into competition with them for their purchase. At sheriff's, executor's, and administrator's sales; in every sale where the cupidity or necessity of the owner makes him ask a high price, or if the slave is forced into market, he is purchased almost invariably by a trader. As the number of slaves diminishes, the demand for their labor will increase according to their scarcity, both at home and in other markets, until they become so dear that little or no profit can be made by purchasing them on the richest farms—and none whatever on those farms of a poorer quality. The traders will continue to purchase and to give high prices, and to rise in their bids, until the owners of poor lands first, will be thrown out of competition; then the owners of the next best lands, and so on, until the farmers on the richest and best improved estates will not be able to give the exorbitant prices and realize any profit. The farmers having poor lands will see that they can make greater profits by selling than by working them; hence they will sell all they can spare, stop the cultivation of the poor shifts and confine themselves to the richest spots; the residue of the plantation being left to waste and lie unproductive. Such must be the fate of all the poor spots when the wages of labor are too high to enable the farmer to make some profit by working them; for it is absurd to suppose that any person will employ his capital or his labor, where it yields him no profit. Their price here is not regulated by our profits, but by the profits of their labor in other states. If tobacco falls to four dollars a hundred, and wheat to fifty cents a bushel, it would cause no fall in the price of negroes—for they are already far above their value in our own markets, according to the present prices of our produce. The variations in the price of our produce, the decline or improvement of agriculture in this state, will not affect their price so long as cotton and sugar continue high. Their value is regulated by the articles produced in other states—their price here, by the competition of the traders to those states; and if we made no profit by their labor they would sell no cheaper, for the traders could get just as much for them as if our tobacco and wheat sold high. We must regard their value as fixed, and dependant upon the price of produce, not of our own, but of others. There will then, be two values for the same slave throughout our state; his *nominal* value, or what he is worth to the trader, which depends on the price of the produce of the west and south—his *real* value, or what he is worth to one of our farmers, to be employed here, which is much *below* the trader's price. We must, however, always give more than the *real value* for the negro, because we have to bid against the trader. What then, must be the necessary consequence? As we are, from adventitious circumstances, compelled to give more for negroes than they are really worth, and as this high price is entirely independent of the profits of their labor, their profits will be diminished. The farmer here will make smaller profits by agriculture upon all qualities of land, which cannot, for the reasons before stated, make the slaves fall in price. For however small his profits here, that does not lower his price. The value of land must of necessity be reduced when the profits derived from its cultivation are lessened from any causes; capital will in consequence be withdrawn from that employment and invested in more productive

stock. The poorest shifts, yielding the smallest produce, will first be turned out of cultivation, instead of being reclaimed or improved. And while the general profits of farming are lessened, the farmer, so far from being compensated for improving his poor land, is scarcely rewarded when working his richest. When there are any two markets for labor in one of which double the price can be given, which can be afforded in the other, it is self-evident, that the labor will always be purchased where its price is the highest; and the market which cannot afford to pay so high, will always be depressed under the disadvantage of having to pay for labor higher than it is worth to them, and thus deduct from their profits. Thus the western and southern markets for our slaves, offer the greatest and most serious obstruction to the progress of improvement. How this is to be obviated, will be examined in the next number.

A PLANTER.

Ashland, Halifax, Va.,
Feb. 5, 1835.

From Hood's Comic Annual.

PLEASURES OF THE COUNTRY, FOR YOUNG TOWN GENTLEMEN.

Letter from a boy, a new resident in the country, to his friend in London.

* * * * Now, Bob, I'll tell you what I want. I want you to come down here for the holydays. Don't be afraid. Ask your sister to ask your mother to ask your father to let you come. It's only ninety mile. If you're out of pocket money, you can walk, and beg a lift now and then, or swing by the dickeys. Put on cordroys, and don't care for the cut behind. The two prentices, George and Will, are here to be made farmers of; and brother Nick is took home from school, to help in agriculture. We like farming very much; it's capital fun. Us four have got a gun, and go out shooting; it's a famous good un, and sure to go off if you don't full cock it. Tiger is to be our shooting dog, as soon as he has left off killing the sheep. He's a real savage, and worries cats beautiful. Before father comes down, we mean to bait our bull with him. There's plenty of New Rivers about, and we're going a fishing as soon as we have mended our top joint. We've killed one of our sheep on the sly, to get gentles.* We've a pony, too, to ride upon, when we can catch him; but he's loose in the paddock, and has neither mane nor tail, to signify, to lay hold of. Isn't it prime, Bob? You *must* come. If your mother won't give your father leave to allow you —run away. Remember, you turn up Goswell street to go to Lincolnshire, and ask for Middlefen Hall. There's a pond full of frogs, but we won't pelt them till you come; but let it be before Sunday, as there's our own orchard to rob, and the fruit's to be gathered on Monday. If you like sucking raw eggs, we know where the hens lay, and mother don't; and I'm bound there's lots of bird's nests. Do come, Bob, and I'll show you the wasp's nest, and every thing that can make you comfortable. I dare say you could borrow your father's volunteer musket of him, without his knowing of it; but be sure any how to bring the ramrod, as we have mislaid ours by firing it off.

* Carrion maggots for bait.

REMARKS ON THE STATE AND PROSPECTS OF THE FARMERS' REGISTER.

Addressed to correspondents and subscribers.

As this number of the Farmers' Register will complete the second volume of this work, and close the two years that have been devoted to its support, the occasion will be used to offer some remarks on its condition and prospects. These remarks are the more required, because the value, the reputation, and the permanency of this journal, are principally due to the efficient aid of its correspondents. The editor has never ceased to feel, and to acknowledge, that without the aid which he has received from the pens of others, he could have done nothing. It was the fear of not being able to draw forth such aid, which rendered the undertaking at first most hazardous in his own opinion—and almost desperate in the opinions of most of his friends. But the result has been far better than even the most sanguine hopes had anticipated. More than 170 individuals, mostly cultivators of the soil, have already been induced to contribute to the original contents of the Farmers' Register, without including any of those whose letters have merely furnished published extracts from private correspondence. When this fact is considered, in connexion with the well known repugnance of farmers to writing for publication, it will be admitted that, in this respect, the undertaking has been remarkably successful. There are accessions to this list in every new number, and a general increase of the whole quantity of original matter, furnished by old and new correspondents.

As the far greater share of the value and usefulness of this journal justly belongs to its correspondents, the editor may be permitted to speak of its effects and beneficial influence, without being considered as claiming but a small share of the merit of sustaining its existence. But however small may be that share, he is far from affecting to hold it as of light value: on the contrary, it is a subject of pride and gratification, as constituting the greater part of those few acts of his life, that may have some lasting influence on the welfare of his country. Every correspondent who has added some value to the contents of the Farmers' Register has a right to enjoy a greater or less share of the like self-approbation: and the more such feelings are cherished by all, the more likely it will be, that there will be a continued and increasing accumulation of beneficial results, derived from their combined efforts.

With means thus afforded for obtaining and diffusing information, this journal has done much for the benefit of agriculture. The knowledge of numerous opinions and practices, before confined within narrow limits, has been extended over a wide region: increased attention to the improvement of soils and of tillage, is beginning generally to be given: proper views of legislative oppressions on agriculture are spreading, and beginning to operate—and even already some valuable results of this new state of things are seen in the late proceedings of the legislature of Virginia, which may be considered as auguring still more extended and beneficial action for the developement of agricultural resources, and the guarding of agricultural interests,

But however useful may have been the combined efforts exhibited in the pages of this journal, the benefit as yet has been very small, compared to what may be obtained by more general exertions: and extensive as is the list of contributors, there are far greater numbers among the subscribers who might render in that way great service, and to all of whom this journal is not yet indebted for a single communication. Let all such persons but follow the good example of others, and nothing more need be required to assure the speedy doubling the value of the contents, and far more than doubling the circulation and beneficial influence of the work.

The subscription list has continued to show a slow but steady increase. At the close of the first volume, more than one hundred names were withdrawn. This was less than had been expected—as (besides all other reasons) many persons will aid the commencement of a new work which they deem of public value, without feeling any personal interest in its contents, or intending to continue subscribers longer than a year. This loss has been more than made good by new subscriptions. The present number for Vol. II. and commencing with its beginning, is not much short of 1400 copies, and the greater part of all new subscribers have also taken Vol. I.—which demands have nearly exhausted the impression of 1500 copies of that volume. The principal support from subscriptions is still derived from the eastern half of Virginia—and very little has yet been furnished west of the Blue Ridge Mountains, (except the county of Rockbridge, which has given a liberal support,) or from any other states except Maryland, North Carolina, South Carolina, and Alabama, each of which gives a moderate and growing subscription. Even in the region in which the work is best supported, there are particular counties which give very little aid. Nothing is wanting to obtain subscribers in all the places where there are now few or none, but some exertion from men of influence, who will make the existence and character of the work known, and thus induce the addition of new names. In every neighborhood where it is known that some one individual has already so labored for the success of the work, there has been obtained a good and enduring support. But without such aid, the usefulness, and even the existence of an agricultural journal becomes known very slowly. The editor pretends not to any personal claim for such favors—but he presumes to ask some such exertion of the influence of every one of his present subscribers who believes that by supporting the Farmers' Register, he is promoting the agricultural improvement and general prosperity of his country. A full, though not direct return may be made to subscribers from such aid. Various improvements of the work are under consideration, and will be made as soon as its increased income may permit—such as a more frequent use of engravings—more extended sources of information from foreign publications—the offering of premiums for experiments, &c. —the employment of competent persons to make personal examination, and prepare reports of well cultivated farms, or districts—and either increasing the size, or lessening the price of the publication—all are objects in view, the attainment of which will depend on a sufficiently augmented subscription list. There would be nothing more interesting, or valuable, than the publication of full and correct reports of the practices of particular farms, or of larger districts, distinguished for good husbandry—and the desire has never ceased, to present something more of that kind than has been done already This intention has been delayed only because of the difficulty of employing competent tourists and reporters, and the want of sufficient profits to make adequate compensation for such valuable services. The aid and the purse of the commonwealth would be required, and ought to be given, to obtain full and correct agricultural reports of the various sections of Virginia. Nevertheless, even by private and individual efforts, it is hoped that some such materials may be collected—some fragments exhibited as specimens of the value of a general and complete report of the agricultural practices, improvements, and resources of the country.

Many public spirited individuals, who are not land holders, have become subscribers to this work, who, of course, can derive no direct profit from the publication. But in the great majority of cases, its supporters are practical farmers, or land holders—and for all such, the assertion may be hazarded, that every one derives from its contents a direct pecuniary return, at least equal to his expense—and in many cases surpassing the cost an hundred fold. If this view of the subject was fairly taken, and the question of supporting the work could be placed on this footing, nothing better would be wanting for its success: and no greater number of subscribers need be coveted, than those who might (and would, if they were readers,) derive as much instruction as would at least repay the value of their purchase money.

At the close of a volume many withdrawals of subscriptions must, of course, be expected. Of those subscribers who may determine to withdraw their support, it is requested that they will make the annunciation as soon as possible—and at any rate not postpone it until the commencement of another year of publication leaves them no such power. The requisition of a timely notice of every discontinuance *must* be uniformly adhered to: and to this, as well as to every other condition of the terms of publication the particular attention of subscribers is again earnestly requested.

With this No., accounts will be sent to all persons who are now indebted for two years' subscription.

The payments for subscriptions, have in general been made with uncommon punctuality—and without any solication by collectors, or otherwise, except the sending of a bill to those only who had not paid for the *first year*, after seventeen months from its commencement. But while thanks are due to much the greater number for their marked attention in this respect, there are still more than 200 who have received the work from the commencement, without having as yet paid any thing for their subscription. Some of these we know to be wealthy men, or otherwise of

the most perfect responsibility, and in whom this omission has been caused solely by forgetfulness of such small matters—and perhaps there are very many such who are not known. We shall be very unwilling to act (but yet know not how to avoid it,) in the same manner towards this class of debtors, and those persons who subscribed "merely to encourage the work," without caring to read, or intending to pay for it. It will be absolutely necessary to erase the names of all who continue in arrears through two volumes, and who are not known to be responsible debtors: and if in so doing, we should include persons for whom that measure was not required, and whom we should be sorry to offend, they ought in justice to acquit us of the blame, and take it to themselves. But whatever reduction of our list may be made in this manner, even should it prove a permanent diminution, it will leave the publication more clear profit than heretofore, when issuing to many more non-paying subscribers, who have swelled the profit of the work only in appearance, and diminished it in reality. The claims on the few and widely scattered subscribers in other states, are merely *debts of honor*, not secured by any legal responsibility—for they are seldom worth collecting by law, and must be generally lost, unless paid voluntarily.

INUNDATED LANDS OF LOUISIANA.

It is stated in the New Orleans Advertiser that upwards of *five millions of acres of land* in Louisiana are subject to annual inundation, and that that amount comprises about one-sixth of the entire territory of the state. From the same paper we learn that the gross amount of land under cultivation does not exceed forty thousand acres, the annual product of which is about ten millions of dollars, or an average of two hundred and fifty dollars per acre. In view of these singular and striking facts, the editor urges the necessity of suitable efforts to reclaim the inundated lands, the profits arising from which would, he contends, be enormous.

FLORIDA COFFEE, NEITHER OKRA NOR COFFEE.

To the Editor of the Farmers' Register.

Columbia, S. C. April 10th, 1835.

I see by your Register for this month, a short article on the Florida coffee, the writer of which presumes it to be okra seed. But he is mistaken: it is neither okra nor coffee. Persons who have had it prepared as coffee, tell me that it does not taste much like coffee; but is, they think, richer, and that the taste is such that it is probable people would become fond of it. It was awkwardly done in the person who sent a quantity of the seed to this country for sale, that he did not send the botanical name of the plant, nor a description of it. As I have planted a little, I shall soon see what it is. Although the price of the seed was very high, $2 per pound, it seems to have excited here a great deal of curiosity, and I believe there was not seed enough for the purchasers. It was wrong also in the gentleman to have announced it as coffee, giving to understand that it was an annual species of it; for it does not follow that, because it is not coffee, it is without value, which is an objection made by some persons. But is coffee the only good thing of which a good morning and evening drink is made? Tea and chocalate are not coffee, and yet they are deservedly held in high estimation, and why should there not be another added—only call it by an appropriate name. Should, however, this plant prove worthless as a substitute for coffee, if the gentleman's account of it be correct, and I have no reason to doubt its being so, it may prove very beneficial in a totally different interest. The plant is said to grow in poor land, old cultivated land, (and I presume that it grows still better in rich soils,) that it yields a very great abundance of foliage and stems, and thereby returns to the ground more than it takes from it. If it be so, we have found what I have long considered a desideratum in agriculture, viz: a plant to turn in the ground for manure, which cattle will not eat—for, as I know by my own experience, if a plant intended for this purpose is good fodder, it will be more likely to be cut for the latter purpose, than buried for the former. I send you a few seeds of it that you or some of your friends may try whether or not it will grow well in your state. Pray send my old friend H. B. Croom, a few of the seeds of the Florida coffee, that he may see it is not okra. It was not till I came to this part of my letter that I found the communication was from Mr. Croom.

N. HERBEMONT.

N. B. Okra or ocra seed is worthless as a substitute for coffee.

From the New York Farmer.

ON STOCK FOR THE DAIRY.*

Live stock, inculding horses, neat cattle, sheep, and swine, is as important a subject as any to which the farmer's attention can be directed. That there are distinct breeds of various and peculiar properties, which render them adapted to the different purposes of labor and food; that all of them under proper management, are susceptible of improvement; that by judicious crossing, comparatively new breeds may be formed, certain desirable properties be extended, increased and propagated, and what we deem defects or faults, remedied or entirely abolished, are points so well established in respect to all the animal creation, so entirely confirmed by experiments within the knowledge of every man who has any pretentions to intelligence, that it would be idle to waste one word in attempting to establish them. That like tends to produce like, and that physical, intellectual, and moral qualities are transmitted from the sire to his offspring, are among those established laws of nature which common observation ascercertained long before science attempted to explore, and teach their wide and universal operation; or experiment, with unhesitating confidence ventured practically to apply them.

The farmer who disdains or neglects these established truths, or who fails to act upon them let the sphere of his operations be as humble as it may be, is blind to his true interest, and can lay

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*The writer of this piece is the Rev. Henry Colman, one of most distinguished agriculturists of Massachusetts. ED. FARM. REG.

no claims to his rank among the class of careful and intelligent husbandmen. The attempts and generous efforts, therefore, of these public spirited men who have sought to avail themselves of the long experience and extraordinary advances of older countries in the improvement of their domestic animals, and with the most praiseworthy liberality to spread these advantages among us, entitle them to high regard, and justly place them among the benefactors of the community.

It is with these views, with sentiments of gratitude and respect, that I have regarded the liberal, and in many cases the entirely disinterested exertions and expenditures of gentlemen in various parts of our country, to introduce the best breeds of neat cattle from abroad, and to extend their advantages as widely as possible; and it is with ineffable contempt and disdain that I here the sneers which the malignant, narrow-minded, and ill-bred, cast upon such patriotic services, and to which I am sometimes compelled to listen. It cannot, however, be demanded, that we should hail every innovation as an improvement, or that we should admit without ample inquiry, and the severe test of actual experiment, and exact comparison, that the introduction of any foreign breed of animals, with a view to propagation must be an advantage. This is a question of fair discussion, and one which is to be settled, not by any imaginary or conjectural standard—not by theories, however plausible—not by mere guesses, or vague reports, unattested by competent authority; but by direct examination—by simple, authenticated, and incontrovertible facts.

From the first time I ever saw one of the fine animals of the Improved Durham Short Horns, I have been an admirer of this beautiful race, not only for the symmetry of form which they present, but for the wonderful success which has followed the skill, perseverance, and enterprise of those breeders, who have boldly attempted to form and propagate a race of animals after their own *beau ideal* of excellence. It has been my good fortune to see many of the choicest specimens of this noble race which have been brought into the country, and of those which have been propagated from them since their arrival, at the cattle shows at Brighton, Worcester, and Albany; in the establishments of private individuals—at Salem, in the possession of E. H. Derby, Esq. to whose care were entrusted the magnificent animals, Admiral, and Flora, sent as a present to the country by Sir Isaac Coffin, whose munificence is above all praise; at Col. Jacques', in Charlestown, who had in his possession Cœlebs, and the matchless bull Bolivar; at the late Mr. Williams', in Chelsea, who had a numerous herd of them; at Hon. John Wells', in Dorchester, who had several valuable cows; at Gov. Lincoln's in Worcester, who was justly proud of Denton's progeny; at James D'Wolf's, Esq. in Bristol, whose cows with their deep udders were magnificent; at Henry Watson's, Esq., in Windsor, where I had the pleasure of seeing the celebrated bull, Wye-Comet; at Charles H. Hall's, Esq. in Harlæm, whose Short Horns, and whose Devons, a present from the fine stock of Mr. Coke, contended for the palm of excellence; at Powelton, at the establishment of the most liberal importer and most devoted advocate of this fine race, whose admirable animals were a perfect justification of the enthusiasm with which he regarded them; at Albany, where besides various fine specimens of the stock from different individuals, (whose names, as I saw their animals, but not their owners, only at a public show, I shall be pardoned for not remembering,) I had the gratification of seeing Mr. Van Renselaer's extraordinary bull of two years old, and Mr. C. N. Bement's imported cow, whose superior in promise and general appearance I have never yet seen; at Messrs. Percy's and Rogers', at Hoosic, N. Y. whose stock is admirable, and have been managed with great care; and at Hyde Park, at the noble establishment of Dr. Hosack, where without question, judging from the actual inspection of their yield of milk, as well as their general appearance, I found the most numerous and finest family of Short Horn cows that I have seen, or which, indeed, I ever expect to see; and a bull whose splendid form gave him a just right to preside over such a seraglio.

Greatly, however, as these opportunities have contributed to my personal gratification, I shall not assume the character of a practised, or in any measure a competent judge. I hold myself as no other than a plain inquirer after truth; much as I have admired their appearance, and delighted as I have been with the encomiums which I have heard passed upon them, and not doubting in any case that great advantages are to result from their introduction into the country—if no other, the great one of seeing what can be done in such cases by human skill and perseverance—still I wait anxiously for more facts before I make up my judgement as to the extent of these advantages, and in what particular respects these advantages are to be found. I am aware that I am approaching an exciting subject; I recollect with sorrow the angry collision into which two highly respectable gentlemen were brought on this very matter, and the fear of kindling again in others these slumbering, may I not rather hope, these extinguishing fires, has long deterred me from entering upon it. I shall not willingly, however, provoke hostility; I shall engage in no controversy. If there must be contention among the short horns and the long horns, let the cattle settle it among themselves. I go into the field unarmed, and as a non-combatant.

There are various points yet to be settled in respect to these cattle. Their early maturity, a most valuable property, seems to be determined. That they are great consumers is equally admitted. Their general tendency to keep themselves in high condition is not so well settled. In Brighton market they do not sell so well as our native stock, because, as it is believed there, (I have it from the highest authority,) they do not *prove* as well—that is, do not have so much tallow. It is obvious they can have had but few samples for trial, and those not perhaps of the best kind; there must have been very few indeed if any, of the pure blood. But a matter which I deem of great importance, especially to the northern section of the country, is whether they are preferable to stock already to be found among us for dairy purposes. Here it is we want facts; exact, authentic, and well established statements of the quantity and quality of their milk; how much milk has been obtained from them; how many pounds; how many quarts; whether beer or wine measure; how much butter and how much cheese has been obtained from

them in a given time; and how at such times they have been managed and fed: and as, in such a case as this, the public advantage ought to be our only object, and the truth must in the end be equally important to all, we respectfully ask gentlemen, who possess these fine animals, to make these experiments and examinations and fully report them; that if it should appear they are as valuable for dairy purposes as has been represented, the agricultural public may know what a blessing is within their reach; but if it should be found that they are not so productive as animals which have long been possessed among us, we may be induced to further, by more judicious selection, and more faithful and liberal keeping, the improvement of our own native stock.

The only decisive experiment, which has come within my knowledge, is that of a cow, called Belina, owned by John H. Powell, Esq., Philadelphia, from whose milk, in three days in May, 1827, eight pounds thirteen ounces of butter were obtained, which would be equal to twenty and one-half pounds per week. This is an extraordinary yield, but it will be perceived that it was a very short trial, and that it was only an individual example. It were greatly to be wished that this public spirited gentleman had given the public further results of the same cow, and likewise the results of similar experiments with others of his noble animals. My own experience with this stock has been singularly unfortuate. I have had seven of them, some full blooded and others half blooded, from Cœlebs, Admiral, and Denton; and, for the quantity and quality of their milk, they have been very inferior, I had almost said worthless, even under every advantage of keeping and attention. I by no means, however, consider my own experience as conclusive; as I know some who have been more fortunate, and I am myself determined upon further trials.

In the absence of this desirable information respecting the produce of the improved Durham short horns, I shall undertake to give some examples of the produce of our native stock, which are well vouched, and many of which have come under my own observation. They may serve at least as matter of entertainment, if not of useful instruction.

1. A cow owned by C. Oakes, Danvers, Mass., 1816.
   In 1813, made 180 lbs. butter.
   1814, " 300 " "
   1815, " over 400 " "
   1816, " 484¼ " "
   In one week this cow produced 19¼ lbs. butter, and averaged sixteen pounds per week for more than three months.
2. A cow owned by —— Nourse, Salem, Mass., 1824, and afterwards by Col. Pickering.
   This cow made upwards of twenty pounds one week, and averaged over fourteen pounds per week for four months.
3. Cow —— Wheeler, Framingham, Mas., 1821.
   Eleven pounds butter in one week. 13 beer quarts at one milking.
4. Cow—N. Sanderson, Walthem, Mass., 1828.
   Thirteen and one-half pounds butter per week through the season, on an average.
5. Cow—John Barre, Salem, Mass., 1823.
   Average yield for two hundred and sixty eight days, 10¾ beer quarts per day.
6. Cow—John Stone, Marblehead, Mass., 1823.
   From June to October, averaged eleven pounds of butter per week.
7. Cow—Luke Fiske, Waltham, Mass., 1824.
   Made 12 pounds butter per week.
8. Cow—Geo. H. Hardy, Waltham, Mass., 1826.
   Average, for four months, eleven pounds and three quarters per week.
9. Cow—Rev. Jno. White, Dedham, Mass., 1826.
   Gave 12 pounds butter six weeks in succession—one week 12 lbs. 13 oz.—3 months averaged 10¼ lbs. per week—gave 18 qts. milk per day at times.
10. Cow—N. Pierce, Salem, Mass., 1826.
    3,528 qts. milk per year—nearly 10 qts, per day.
11. Cow—Jas. Robbins, Watertown, Mass., 1827.
    May and June, from 10 to 13 lbs. butter per week.
12. Cow—Ralph Haskins, Dorchester, Mass., 1827.
    18 qts. per day—average 14 to 15 qts. Before grass feed in April, the cream of two days made 2¾ lbs. butter, and was made from 2 1-16 qts. of cream. Two or three minutes in churning.
13. Two cows—Rev. John Phenix, Chicopee, Mass., 1828.
    For several weeks averaged 20 lbs. per week, beside what milk and cream were used in the family.
14. Cow—E. Harris, Moorstown, N. J., 1829.
    32 qts; per day—supposed wine qts.—feed, good pasturage.
15. Cow—Jeremiah Stickney, Rowley, Mass.. 1829.
    19 qts. daily—calf, at six weeks old, 196 lbs. gain 2 3-7 lbs. per day.
16. Cow—W. Chase, Somerset, R. I., 1831.
    Most of the season 20 qts. of milk daily—averaged nearly 14 lbs. of butter per week during the season—120 lbs. made in ten weeks.
17. Cow—Israel Graves, Northampton, Mass., 1830.
    Four years old—one week, 13 lbs. 9 oz. butter.
18. Cow—Isaac Osgood, Andover, Mass., 1831.
    17 quarts milk per day—50 lbs. butter in the month of June.
19. Cow—L. Hosmer, Bedford, Mass., 1830.
    14 lbs. of butter per week.
20. Heifer—2-3 years old—L. Hasseltine, Haverhill, Mass.
    14 lbs. of butter one week—18½ lbs. in 10½ days.
21. Cow—Saml. Noah, Danvers, Mass., 1831.
    In 148 days from 2d May, gave 587⅛ gallons milk—more than four gallons per day beer measure.
22. Cow—Timothy Flanders, Haverhill, Mass., 1832.
    From 20th April to 22nd September, besides 46¼ gallons milk for family use, made 163 lbs. 4 oz. butter.
23. Four cows—Jesse Putnam, Danvers, Mass., 1830.
    Averaged more than 200 lbs. butter each in the season—highly fed.

24. Six cows—J. Curtis, Marblehead, Mass., 1830.
Average over 181 lbs. butter each, without extra feed.

25. Cow—S. Sergeant, Stockbridge, Mass., 1831.

From 8th April,	1828,	321 days,	381 lbs.	6 oz.
16th "	1829,	284 "	298 lbs.	1 oz.
5th "	1830,	306 "	318 lbs.	10 oz.
		911 days,	943 lbs.	1 oz.

The above is exclusive of 25 lbs. 9 oz. made while fattening 3 calves, and furnishing a family of four persons with milk and cream.

26. Cow—W. Dickinson, Deerfield, Mass., 1830.
One week, 14 lbs.—first eight weeks after calf was taken away, made 96 lbs. Six quarts of milk made one pound of butter.

27. Cow—H. G. Newcomb, Greenfield, Mass., 1830.
From March 27th to May 25th, made 100 pounds of butter, and reserved 160 quarts of milk.
In 14 days, made 29 $\frac{3}{16}$ lbs. of butter.

28. Cow—D. Wait, Greenfield, Mass., 1830.
In one fortnight made 25 lbs. of butter.
In May, 1832, she produced in one week 15$\frac{3}{4}$ lbs. of butter. Average daily weight of milk, 37 lbs. Measured one day 26 beer quarts.

29. Two cows— —Hart, Shelburne, Mass., 1834.
Besides milk and butter used for a family of 3 persons, they sold from these two cows last season upwards of 400 lbs butter—feed, grass only. In June, she made in one week 23 lbs.—one week 25 lbs.—one week 28 lbs.

30. Cow— —Barrett, Northampton, Mass., 1830.
This cow milked, for one fortnight, every eight hours—at each milking has yielded a pailful holding ten quarts—the weight of the milk averaging daily 49$\frac{1}{2}$ lbs. Her milk has yielded daily 2 lbs. 5 oz. butter—making 32 lbs. 6 oz. in 14 days. From one milking alone 1 lb. 6 oz. were made, which will give 4 lbs. 2 oz. of butter in one day from one cow—the butter was of a superior quality, and brought a high price in this market.—*Northampton Courier, March* 1833.

31. Cow owned in New London, Conn., yielded 10 quarts milk per day for 14 successive months.

For the 30th example I have only the authority quoted, which I have no reason to doubt. Most of the others have been authenticated under oath; and most of the cows and owners I have seen.

I have already, Mr. Editor, extended this communication to an inordinate length. I shall leave it for the present, without farther comment; and only add, in behalf of myself and the whole agricultural public, that the respected and liberal gentlemen, owners of the improved Durham stock will confer a great obligation, and add to their patriotic services, if they will favor the public with as exact and full statements, from their own actual experiments, of the dairy produce of their beautiful and valuable animals.

H. C.

Meadowbanks, Feb. 8th, 1835.

THE QUANTITY OF WOOD REQUIRED TO BURN LIME.

To the Editor of the Farmers' Register.

New Kent, March 4th, 1835.

In the 1st Vol. and 1st No. of the Farmers' Register there is an article headed "Memoranda of cultivation and improvement practised by Fielding Lewis, Esq. of Weyanoke," to which my attention has been particularly called, by the information it gives on the subject of liming, and the burning of shells. I have put up several kilns this spring, and the quantity of wood prepared for them was ascertained by reference to the quantity said to have been used by Mr. Lewis. In every case, I found I had more wood than could be placed in the kilns, if I observed the directions of Mr. L. This has caused me to re-examine the statement made in these memoranda relative to the kiln of 100 hhds. of shells, and unless I am greatly deceived, there is an important error as to the quantity of wood. The kiln is said to have been "17 feet by 17 feet—and 9 feet high, inside measure, and ten cords (besides three of kindling wood,) were used in burning it." Now sir, will you be so obliging as to tell me whether it is possible to put ten cords of wood and 100 hhds. of shells in that space? And whether the 77 inches allowed for the shells would contain 100 hhds? It is probable the layers of shells were thicker than Mr. L. supposed. But I think that more than six cords of wood (except for kindling,) could scarcely have been consumed in such a kiln. My object is simply to call your attention to it, that you may correct any material error on this important subject.

J. S.

[Mr. Lewis, though noted for his accuracy, might have made some mistake in the quantities which he stated—and if so, J. S. has had, in actual trials, better means than we could bring, to establish the error. But without such trial, the calculation of the space occupied by the wood and shells separately, will not show what space they would require when placed in alternate layers—and for this reason: In measuring corded wood, the hollow spaces are counted as much as the solid wood: but when disposed in thin layers, most of these hollows would be filled with the shells. The openings between the logs forming the pen (not included in the inside measure of 17 feet) would also take many cubic feet of shells. Besides—the space left below the kiln, of a foot in depth, was filled with the kindling wood—and possibly was added to after the fire commenced.]

REMARKS ON THE DIFFERENT SPECIES OF COTTON.

To the Editor of the Farmers' Register.

I sent you lately some remarks on Mr. Spalding's article on the different species of cotton cultivated in the United States. These were stated to be three in number. 1. The Green Seed Cotton (*Gossypium herbaceum.*) 2. The Mexican Cotton (*G. hirsutum.*) 3. The Sea Island Cotton (*G. barbadense?*) A fourth species may now be added, the *nankeen cotton* from China, which is now beginning to be cultivated by a few persons

in Georgia. The seed are scarce, and it will probably be some years before it is produced in abundance. Indeed it is probable that the market never will require a great quantity of it.

I feel a curiosity to know what species of cotton it is which is now cultivated in Egypt, and whether it is prepared for market by the saw-gin? I perceive by the Liverpool price currents, that the Egyptian cotton ranks next to our sea islands, and much above our upland cotton. This leads me to suppose that it is not the G. herbaceum, (which however has been long cultivated in Syria and the Levant,) and I know not what other species it may be. If any of your correspondents, either in this country, or in Europe, can give information on this point, I should be glad if he would communicate it through the Register. It would also be desirable to procure some of the seed of the Egyptian cotton and have it tried in some of the southern states. Our consul at Marseilles might procure the seed from Alexandria, and ship them to the United States.*

In my remarks on Mr. Spalding's article on cotton, I have given the specific characters of the *gossypium barbadense*. It may be well to add, as an appendix to my remarks, the characters of all the species then mentioned, as furnished by the Encyclopædia of Plants—as follows:

1. "*Gossypium herbaceum*, [green seed cotton.] Native country, East Indies—leaves 5 lobed, 1 glandular beneath: lobes round mucronate, Invol. serrate, stem smooth."

2. "*G. hirsutum*, [Mexican and Petit Gulf,] South America—upper leaves undivided cordate; lower 3-5 lobed with 1 gland beneath: branches and petioles hirsute."

3. "*G. barbadense* [sea island cotton?] Barbadoes—upper leaves 3 lobed; lower 5 lobed with 3 glands beneath; stem smoothish."

4. "*G. arboreum*, [tree cotton,] East Indies—leaves 5 lobed palmate; upper 3 lobed with 1 gland beneath, Inv. tern. Cal. with 3 glands at base."

H. B. CROOM.

EGYPTIAN COTTON.

To the Editor of the Farmers' Register.

In my remarks on Mr. Spalding's essay on cotton, I said—"It may be doubted whether Mr. S. is correct in supposing that the wool of the Sea Island cotton becomes less fine when carried south of the St. Mary's."

This doubt I must now retract, subsequent inquiry having satisfied me that the cotton of the West Indies is not so fine as that of the Sea Islands of Georgia and South Carolina, though produced, as I suppose, from the same plant.

In an article in a late periodical, purporting to be an abstract of a lecture on the natural history of the cotton plant, delivered in London by a Mr. Aikin, it is stated that the wool of the Egyptian cotton is long, fine, and silky, and that it has lately "been improved by the introduction of the seeds of the Sea Island cotton." How is this to be understood? That the Sea Island cotton has superseded that which was before cultivated?—or does the lecturer mean that it has been *crossed* on the other? But hybrid plants as well as hybrid animals are, I believe, generally barren.

A difference, however, should be noted between *varieties* of the same species, and *hybrids*, which result from the mingling of different species.

H. B. CROOM.

March, 1835.

* We have made an attempt to gratify our correspondent's wish to obtain cotton seed from Egypt, which we hope will be successful.—Ed.

HONEY LOCUST AND MOUNTAIN LOCUST.

To the Editor of the Farmers' Register.

* * * The Honey Locust (Gleditschia) is native in the alluvial portions of Virginia and the Carolinas. The White or Mountain Locust (Robinia pseudacasia) I think, is not. Its native position is on the Allegany Mountains; but it has been so much disseminated by transplantation, as probably to lead you into an error in this respect. If I am wrong, the error is common to all the writers on the botany of North America. I have seen it in great profusion on the ridges of the Allegany Mountains; but I do not remember to have seen it any where native in the low or level country.

H. B. C.

[With the great deference which is due from us, confessedly ignorant of botany as we are, to the opinions of one who possesses much knowledge on that subject, we must still doubt the correctness of the information which our correspondent has received as to both these trees. The honey locust is so rarely seen in lower Virginia, except near dwellings, that it has therefore been supposed to be a foreign tree. But if this opinion is incorrect, we can scarcely be mistaken in supposing the other locust, which is called by the various and contradictory names of white, yellow, or black locust, to be a native tree. In this neighborhood, the general and long established name is "wild locust"—which of itself is some evidence of its being indigenous. But the mistake of botanists (if in this matter they are mistaken) is probably caused by this tree being almost never seen growing naturally on any soils except a class that are very scarce in lower Virginia—that is, such as contain a notable proportion of calcareous earth, or lime in some form. In this county, it would be impossible to find a locust growing naturally, a mile from James River, and perhaps, for many miles southward. But on steep river banks, and in deep ravines, where the beds of shell marl, or other calcareous matters have affected the soil, this tree is one of the most vigorous, and rapid in growth, and so general and abundant in the places least touched by the labors of man, that it is scarcely possible that it could have been introduced from a distant region.

The locust is not the only tree so strictly limited to our few soils containing lime, as to be scarcely known to many residents of our country. A respectable farmer who had moved from Surry county to Kentucky, described to us the papaw, as a growth peculiar to that region, and which he had never heard of in Virginia. Yet he had lived 40 years within 20 miles of James River, where, on the rich calcareous hill-sides, the papaw grows and bears its fruit well, and exhibits

the peculiar characters which so strongly attracted this gentleman's notice afterwards in Kentucky.]

PROGRESS OF THE MANUFACTURE OF OIL FROM RAPE IN FRANCE.*

Extract from a Report of a committee to the Agricultural Society of Caen.

Translated for the Farmers' Register from the *Annales de l'Agriculture Francaise* of Dec. 1834.

The manufacture of oil from rape seed has rened such great services to the agriculture of the department, that it deserves to have a distinguished place in the annals of the industry of Calvados. Oil mills have multiplied; the culture of rape is extended; and the cultivators find a ready market for this commodity, which is a valuable resource for them; especially in years when corn is low, and the sale of horses is unprofitable. Honor then to him who has endowed our country with this branch of industry! Honor to the family of Le Cavalier, which first set it on foot and sustained it! They have deserved much from agriculture. About 22,000 hectolitres of rape seed are made in the department, which we may suppose to be the product of 11,600 hectares of all qualities of land fit to be put under this culture. The oil cake which cultivators purchase of the manufacturers of oil, procures for them the addition of manure which the culture of rape makes necessary. The stalks and stems of this plant serve for fuel in the plain, where wood is scarce and dear; or, they may be converted into manure. In this way all the products of the rape may be turned to the profit of agriculture. Forty oil mills are at work in the department, which furnish every year more than 56,000 casks (barriques) of oil, containing 100 kilogrammes each. Of this number, 37 are worked by water, and 3 by steam. The former are situated on many of the rivers which water the department. The waters of many of them are reduced by drought considerably towards the end of summer. The work of the mills diminishes in proportion, and sometimes even ceases for a while. The three moved by steam, are situated at Caen, or at a little distance from the town. The oldest is that of M. Foucamberge, who established it near the suburbs of Maladrerie. He designed it at first to grind corn; but being unable to overcome the usages and prejudices of the country, he abandoned this kind of industry and substituted the manufacture of oil. This good example was followed by M. Larue-Elie, who obtained a steam engine from the cotton mills of the Ursulines, and established an oil manufactory at Mondeville, to which he has joined a manufacture of animal black. The third mill is the one which M. Tillard has recently established in the middle of the town, near the port. This estimable manufacturer has neglected nothing to make it as perfect as possible. More than half of the oil is purified before its exportation. There are six establishments there, in which purifying alone is carried on. All are situated in the town of Caen. Some manufacturers only purify their own oil. Five manufacturers and three refiners have exposed samples of their produce—the former are M. M. Danjou, Tillard, Pierre, Le Cavalier, Marc Elie and Levard; the latter are M. M. Eudes, Nicolas le Cavalier and Frederic le Cavalier. The oil of the manufactures of Calvados has, in commerce, a merited preference; but it would have been impossible for your committee to make a distinction in the quality of the oils of each of these manufacturers: it is then on other grounds that you ought to place your judgement. M. Levard has introduced the manufacture of oil in the arrondissement of Vire. M. Marc Elie has used in his manufacture (situated at Laize-la-Ville) mill stones of granite to crush the seed. M. Pierre le Cavalier also uses these mill stones, and sustains the well merited reputation which his family has enjoyed for so long a time; they obtained a medal at the exhibition of 1806. M. Tillard established in the town a magnificent oil manufacture, remarkable for its steam engine of 16 horse-power, which serves to break and bruise the grain with heavy vertical mill stones of granite, to stir the seed in the stoves, and to squeeze out the oil by hydraulic presses. M. Danjou has many establishments: he manufactures a large quantity of oil, and purifies a part of it. M. Eudes purifies more oil than any one of them.

* See an account of rape oil, and the value of the rape crop at page 646 Vol. I. Farm. Reg.

EXTRACTS FROM A REPORT ON THE AGRICULTURE OF EAST AND WEST FLANDERS.

By the Rev. Thomas Radcliff.

Cultivation of Flax, and application of Liquid Manure.

In addition to those crops in some part of the district,* particularly in the line between Woomen and Ypres, magnificent crops of rape are cultivated, and are relied on as a sure and profitable return.

Flax is also a crop upon which their best industry is bestowed, and their careful preparation of the soil is scarcely to be surpassed by that of the neatest garden. This preparation, is as follows: the field intended for the flax, after two or three ploughings and harrowings, is backed up in the centre, and ploughed round in but one set, so as to leave it without any furrow. The heavy roller is drawn across the ploughing by three horses, the liquid manure is then spread equally over the entire surface, and when well harrowed in by eight or nine strokes of the harrow, the seed is sown, which is also harrowed in by a light harrow with wooden pins of less than three inches, and the surface, to conclude the operation, is again carefully rolled. Nothing can exceed the smoothness and cultivated appearance of fields thus accurately prepared. The manure universally used for this crop demands particular notice—it is termed liquid manure, and consists of the urine of cattle, in which rape-cake has been dissolved, and in which the *vidanges* conveyed from privies of the adjoining towns and villages, have also been blended. This manure is gradually collected in subterraneous vaults of brickwork at the verge of the farm next to the main road. Those receptacles are generally forty feet long by fourteen wide, and seven or eight feet deep, and in some cases are contrived with the crown of the arch so much below the surface of the ground, as to admit the plough to work over it. An aperture is left in the

* The South Western part of Belgium, adjoining French Flanders.

side, through which the manure is received from the cart by means of a shoot or trough, and at one end an opening is left to bring it up again, by means of a temporary pump, which delivers it either into carts or tonneaus.*

In this manner it is carried to the field, and one or other mode adopted, according to the distance. Where the *cart* plies, the manure is carried in a great sheet called a *voile*, closed at the corners by running strings, and secured to the four uprights of the cart: two men, standing one on each side of the cart, scatter it with hollow shovels upon the rolled ground—or where the tonneaus are made use of, each is carried by two men with poles, and set down at equal intervals across the field in the line of the rolling. There are two sets of vessels, which enable the men, who deposite the loaded ones, to bring back the others empty. One man to each vessel, with a scoop, or rather a kind of bowl with a long handle, spreads the manure, so as to cover a certain space; and thus, by preserving the intervals correctly, they can precisely guage the quantity for a given extent of surface. For the flax crop they are profuse, and of this liquid mixture in this part of the country they usually allow 400 hectolitres (in which 3000 rape-cakes have been dissolved,) to the bonnier, which is at the rate of 2480 gallons beer measure to the English acre. As a similarity of practice prevails in that part of No. III. which resembles this in soil, we shall proceed to that district.

DIVISION NO. III.

Boundaries, Soil, general Produce, and Rotations.

This division is bounded on the north by Winple, St. Eloy and Hulste; on the east by the river Lys to Courtray; on the south by French Flanders, and on the west by a line to the east of Rousselaer and Zandvoorde. Its chief places are Courtray, Menin, Wervike, and Dadizeele.

The soil of the southern part of this division is very nearly of the same quality as that of the former; but the remaining part is more sandy. It is a division, however, in great repute, as to its cultivation: its chief produce, wheat, flax, rye, potatoes, oats, and rape-seed. Its secondary produce, buck-wheat, turnips, clover. Its natural meadows, on the banks of the river, yield a fine quality of hay. The country is here more open; the farms larger, the plantations fewer; sufficient, however, for ornament and utility.

On the eastern side of this division is the farm of Vollandre, belonging to a man of the name of Bognert, of about 200 English acres in extent, which being on a great scale for Flanders, is worthy of notice, and especially as marking the general practice of that quarter. This beautiful area of cultivation is laid out as to its crops, in parallel lines, perpendicular to a road without fence, which pervades the entire, and commands both sides for all farming purposes. The contour is that of a rich garden, the effect of industry and manure; for the soil is such as, in our countries, we should hold in disesteem, viz. a light-grey loam strongly impregnated with sand; yet the following crops are produced from it in the best perfection:

1. Rape, with urine and rape-cake,
2. Wheat or rye, with dung,
3. Rye and clover, without manure,
4. Clover, with ashes,
5. Wheat, with urine,
6. Turnips, with dung and urine,
7. Oats, without manure,
8. Flax with abundant manure;

viz. bruised rape-cake 5000 cakes to the bonnier, about 1 ton 6½ cwt. to the English acre, or of liquid manure, (denominated *court graisse*,) 400 hectolitres to the bonnier (as in No. III.,) about 2480 gallons to the English acre.

Culture and advantages of Rape.

Rape-seed is an object of such agricultural moment in Flanders, and so well adapted to the generality of the soil of Ireland, (particularly to those parts which are as yet unreclaimed, but which, through the medium of this valuable seed, might be converted with profit, into a state of cultivation and fertility,) that it was satisfactory to learn, and from so good a practical authority as this farmer, the precise value of his crop at the time of our conversation. His produce was 40 sacks, or 50 hectolitres per bonnier, which is 14⅔ hectolitres, or about five quarters to the English acre. His crop sold by the sack for 39 francs, which would be about the rate of £18 10s. per English acre at par.

Exclusive of the manure, viz. 2000 rape-cakes and sixty-four carts of liquid manure to the bonnier, which is estimated at £19 being about £5 10s, by the English acre, the remaining cost is that of two ploughings and about 80 men employed in manuring, transplanting, weeding, earthing, pulling, and thrashing, the crop; which by the English acre, may altogether be estimated at about £1 12s. The plants are valued at 10s., so the account would stand thus:

	£ s. d.	£. s. d.
Gross amount of rape-seed, per English acre, - - -		18 10 0
Manure, in value, -	5 10 0	
Ploughing, and labor, -	1 12 0	
Rape plants, - -	0 10 0	
	£7 12 0	7 12 0
Profit* per English acre, -		£10 18 0

* The tonneau resembles a beer barrel, and contains 176 litres, about 38 gallons English.

* It is well that the culture of this plant is beginning to extend itself in Ireland, and that ample encouragement is exhibited upon the farm of Mr. Samuel Garnett, near Kells, in the county of Meath, reclaimed by his skill and industry from an absolute marsh, and without any manure except the surface ashes, producing the most luxuriant crops. His first essay, of about eight acres, yielded 17 barrels per acre, and sold at 41s. per barrel, making £34 17s. per Irish acre. In the last autumn he prepared 38 acres of transplanted rape, which promised still better than that of the former year, but was not so productive, and he has now upon the same farm 45 acres for the ensuing crop, sown broadcast, and 3 feet in height in most parts of it, in the month of November.

This reclaimed marsh had been from time immemorial inundated, except from the summer months, when it was merely applicable to horses and young cattle. By taking the proper levels, and sinking the river at a

It is agreeable, in an agricultural inquiry, to bring any thing to a specific point, and this is the result of the practice upon a well-managed farm, in 1817, where manure is always dear, from the great demand, and at a time that rape-seed happened to be low—nevertheless, a very fair return appears, even after the payment of rent and taxes; the rent of this farm being at the rate of 24s., and the taxes at that of 6s. 8d. by the English acre; which leaves a net profit upon each of £9 7s. 4d. But the Flemish farmer is not always satisfied with the profit on the seed. Oil-mills abound in such numbers throughout this country, that he is generally the manufacturer of what is necessary for his home consumption, and not unfrequently for sale. The expenses of the oil-mill in its construction and management, the proprietors make a mystery of; but the profit must be very considerable, as is well known by the farmers who manufacture for themselves. Some establishments of this nature, formed in the reclaimable bogs and mountains of Ireland, would shortly spread the cultivation of this profitable seed, which in many places can be grown without manure, but generally on the burnt surface of the ground to be reclaimed; and by its own refuse, (of cakes from which the oil has been expressed,) capable of renewing the soil which has produced it, and of preparing it for other crops. In mountainous tracts, where limestone is not to be found, but where frequent mill-sites occur, it might prove an admirable succedaneum as a manure, and act as a profitable improvement in every branch of its process.

It is but seldom managed in our countries as in Flanders, but is sometimes there sown, as with us, broad-cast. The general and approved method is however, by transplanting, which they alledge, and apparently with great justice, to have many advantages: one, that the seed-bed occupies but a small space, whilst the land which is to carry the general crop is bearing corn. By having the plants growing, they have time to harvest their corn, to plough and manure the stubble intended for the rape, which they put in with the dibble, or the plough, from the latter end of September to the second week of November, without apprehending any miscarriage.

The seed-bed is sown in August, and even to the middle of September. In October, or sooner, the stubble is ploughed over, manured, and ploughed again. The plants are dibbled in the seams of the ploughing, (each furrow-slice being twelve inches broad,) and are set out at twelve inches distance in the rows. Instead of dibbling upon the second ploughing, in many cases they lay the plants at the proper distances across the furrow, and as the plough goes forward, the roots are covered, and a woman follows to set them a little up, and to give them firmness in the ground, where necessary. Immediately after the frost, and again in the month of April, the intervals are weeded and hand-hoed, and the earth drawn up to the plants, which is the last operation till the harvest. It is pulled rather green, but ripens in the stack; it is thrashed without any particular management; but the application of the haulm or straw, is a matter of new and profitable discovery: it is burned for ashes, as manure, which are found to be so highly valuable beyond all other sorts which have been tried, that they bear a price as three to one above the other kinds, and it is considered, that upon clover, a dressing of one-third less of these is amply sufficient.

The Urine Cistern.

The rape crop has been dwelt upon as one suited to our countries, and extremely prized in Flanders; but how much more valuable to us, whose soil demands not such abundant and expensive manure. The urine cistern, (from which, in this district, the rape crop is manured,) is constructed to contain any given quantity, and is contracted for by the bricklayers (finding materials) at one franc (or 20 sols of France) per tonneau, of 38 gallons English. The usual capacity of the vault, as adopted on the farm of Vollandre, is for 1000 tonneaux, (cost about £45 British,) which quantity for the rape crop will manure little more than two bonniers, or about seven English acres. But the cistern under the stables is nearly of double size: from this the exterior cistern is filled, and between both, the farmer can fairly count upon manuring in the best manner six bonniers, or twenty-one English acres; or perhaps two bonniers in addition, of crops which do not require so much manure. The whole of this quantity (exclusive of farm-yard dung, ashes, composts, &c.) is produced by eight horses, and thirty-six head of cattle, housed winter and summer in well constructed stables, increased by the adventitious aid of the rape cake, and the *vidanges* from the privies. In a cistern of 1000 tonneaux, it is not unusual to dissolve from 2000 to 4000 rape cakes of two pounds each; indeed neither industry nor expense is spared for the collection of manure, as upon that depend the produce and fertility of a naturally bad soil. The farmer who fails to make those exertions, is sure to be left in the back ground.

In the immediate vicinity of this well cultivated farm, one of a very different aspect presents itself: upon inquiring the cause, you are told of the proprietor, "Il n'aime pas *les bons-bons*"—the exulting term for their favorite manure.

The cistern is for the most part formed under the range of stables, from each stall of which the urine is conducted to a common grating, through which it descends into the vault; from thence it is taken up by a pump: in the best regulated, there is a partition in the cistern, with a valve to admit the contents of the first space into the second, to be preserved there free from the later acquisition, age adding considerably to its efficacy.

This species of manure is relied on beyond any other, upon all the light soils throughout Flanders, and even upon the strong lands (originally so rich as to preclude the necessity of manure,) is now coming into great esteem, being considered applicable to most crops, and to all the varieties of soil.

May we not then press it upon the notice of farmers of the British empire? In England and Scotland it is little known; in Ireland not at all. Where farm-offices are to be erected, the additional cost of forming them upon vaults, and regulating the flagging or pavement, so as to supply

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considerable cost, Mr. Garnett has set a spirited example of industry, and now begins to reap the advantage of his enterprise.

those vaults, would be soon repaid by the advantage of the best kind of manure, which at present is universally suffered to flow away in waste. Even to offices already built, an exterior cistern might be added; but it is essential that it should be secure from the admission of rain, or any other water.

The collection made in the winter months would be a great source of fertility; but if once connected with a regular soiling system, the increase would embrace an infinitely wide extent.

By an extensive cultivation of rape, and by the general establishment of these cisterns; to what pitch of improvement and produce might not the light lands of Great Britain and Ireland be speedily advanced? If it be a practical fact, that upon the farm of Vollandre, the urine of 44 head of cattle, with the aid of 12000 rape cakes of two pounds each, is sufficient to manure in the best manner twenty-one English acres, the proprietor of a rape mill, who could house double that number of cattle, might venture on the improvement of an extensive tract, with every prospect of success. But the addition of the rape cake is only for those who have the material in possession, or are able to purchase it; even without it, the liquid manure is highly efficacious, but will not spread so far, or be so permanent; the cost, however, is only that of providing a suitable cistern; and if the mention now made of this practice, shall hereafter appear to have been the means of introducing it into our countries, it may have eventually rendered the cause of agriculture no inconsiderable service.

REPORT ON THE MULBERRY OF THE PHILIPPINES, (*Morus cucullata.**)

Made to the Academy of Dijon, by one of its members, Mr. TILLOY, of the Medical Jury of the department of Coté d'Or, (August 1834.)

Translated for the Farmers' Register, from the *Annales de l'Agriculture Francaise.*

In 1831, I had the honor of making a report to the Academy on a memoir which had been addressed to it by M. Bonafous. The culture of mulberries on meadows, and the introduction of a new species of mulberry, were the subject of this memoir. At that time I only gave an account of the work, not having the means to repeat the experiments which were relative to it. Since, the Academy has owed to the extreme kindness of M. Bonafous the sending of a score of mulberry trees from the Philippines. These are they which have assisted my attempts to make plain the advantages which they present over the other species of mulberry.

As the author of the memoir had mentioned, the shoots of this mulberry increase from six to seven feet in one year, the leaves are rapidly developed, many of them being from ten to twelve inches in length, and from eight to ten in breadth. Besides, it has the great advantage of being increased by slips, and from the large size of its leaves we will admit with M. Bonafous, that five thousand slips of this mulberry would be equal to one hundred thousand plants of the common white mulberry. Since these mulberry trees have been planted, there has not been weather sufficiently cold to assure us that they could stand it: but the experiments of M. Bonafous leave no doubt in this respect. The good quality of the leaves cannot be disputed, after the confidence which one ought to grant to the author, and after the experiments we have made, an account of which we are going to give you.

In the same situation, and in the same temperature, five hundred silk worms have been raised on the common white mulberry, and five hundred on the mulberry of the Philippines. The time of the raising was of the same duration; 15 pounds of the leaves of the white mulberry, and 15 pounds of the mulberry of the Philippines were sufficient for both. The labor of the silk worms being over, the cocoons were weighed: 384 cocoons of the worms fed on the mulberry of the Philippines weighed one pound, while it took 420 of the others for the same weight: both gave two ounces of very fine silk from a pound of cocoons. The only difference that has been remarked, was, that in winding the cocoons furnished by the worms fed on the mulberry of the Philippine, no threads were broken, which was not the case with the others. This is a proof of the superior quality of the silk of the first.

It is then clearly proved that this mulberry has a real advantage over the other species. They give a larger quantity of leaves, cocoons heavier, and richer in silk of the best quality.

If M. Perrottet has rendered a great service to this branch of industry by the introduction of this species of mulberry, M. Bonafous has made that service effectual by his care to multiply the plant, to spread it, and to make all its advantages known.

*The plant described above, under a different name, (both common and botanical) is that known in this country as the Chinese Mulberry, (*morus multicaulis.*) —*Ed. Farm. Reg.*

PROPAGATION OF THE CHINESE MULBERRY.

Translated for the Farmers' Register from the *Somnaire des seances, &c.* of January 7, 1835.

M. Valmorin reads an extract of a letter from M. Maupoil, a Frenchman settled at Dolo, in Lombardy, relating to the rearing of silk worms in 1834, by means of the mulberry of the Philippines. It appears from this letter, that in 1834 the rearing of silk worms on these leaves has succeeded as well as in 1833, or as well as it was possible to desire. It also is there stated, that M. Maupoil, who propagates the mulberry of the Philippines in every mode, has observed that the plants raised from seeds, tended to approach [in character] the common white mulberry; whence he is led to conclude, it may not be but a variety of this mulberry, and that to preserve the former, with the qualities which recommend it, it must be propagated by slips, and by grafting.*

*This additional testimony of the unfitness of the seeds of the Chinese Mulberry to continue its kind has reached us (in the *Annales*, &c. for January 1835) since the note on this subject at page 736, was printed. —*Ed. Farm. Reg.*

QUERIES ON ORCHARD GRASS.

To the Editor of the Farmers' Register.

Intending this spring to sow some of the orchard grass for the purpose of making hay, can I get the favor of you as soon as convenient, to forward me your views—1. Of the time when the seed should be sown. 2. The quantity to the acre. 3. The manner of preparing the land for its reception. 4. The proper time for cutting when used as hay—and lastly, whether or not the article will grow advantageously on high land.

R. P. R.

[Before the foregoing queries could be answered properly, the season for which they were designed had passed. It is hoped that before the next seed time, some reader who is practically acquainted with orchard grass will give the information desired, together with such other statements on the subject as may be useful to those commencing the culture.]

THE VALUE OF LIME AS MEDICINE FOR HORSES.

To the Editor of the Farmers' Register.

Williamsburg, Va., March 27, 1835.

Believing that any communication which has for its object the health of that useful animal, the horse, will be acceptable to very many of your readers, I have thought proper to forward the following remarks, which, if it suits your pleasure, may be inserted in the next number of your valuable journal.

It is probable that more horses are lost from the effects of the grub worm, than from any other assignable cause. Knowing so well therefore, the imminent danger from an attack of grubs properly speaking, it is a matter of the first moment, if possible, by some means to prevent their generation. With this object in view, I have for several years been in the habit of giving my horses a portion of slaked lime in their food. Its effects are—1. To correct any excess of acid in the alimentary canal, and otherwise preserve the healthy condition of the digestive organs. 2. It keeps up a healthy action on the skin, as is evidenced by the sleek coat of hair which the horse will have whilst under its use. 3. It will cause the grubs to be evacuated, either entire or mutilated. My plan is, during the spring and fall months (suspending its use occasionally for two weeks) to give a dessert spoonful twice a day in some kind of chopped food, with meal or bran. It is necessary in order to remove the coarser parts of the lime that it should be passed through a fine sieve. For this remedy, I am indebted to the late Maj. John Pryor, of the city of Richmond, who was proverbial for his knowledge in veterinary science. It appears that in travelling to the mountains during a season of excessive drought, of a great number of waggons on the road, he found the horses of but one to look well. They presenting so fine and healthy an appearance, and their general condition being so widely different from all others met with during his travel, his curiosity prompted him to inquire of the driver of the team alluded to, how it was that his horses were so fat. He replied, that he gave them *lime*. After a long experience, he became entirely satisfied of the efficacy of the article, and I can confidently recommend it as an invaluable remedial agent in not only preventing, but also in the expulsion of every kind of worm from the intestinal canal of the horse.

ROBERT P. RICHARDSON.

For the Farmers' Register.

QUERIES ON SALT MARSHES AND MEADOWS.

Will herds grass grow upon land which has been occasionally overflowed by the salt water of the bay, and in consequence thereof has become well saturated with salt? Would it prove destructive to the grass, if the tide should overflow it once or twice in the course of its growth?

It would be conferring a favor on a brother farmer, and perhaps on many, if any gentleman, who possesses the information, would answer the above questions, and give any other information on the subject of meadows exposed to inundations of the salt tide water.

A FARMER.

Mathews county.

From Insect Transformations.

EARTH WORMS.

The common earth worm (*Lumbricus terrestris*) is instinctively afraid of moles; and no sooner does it hear any subterranean noise, or feel any shaking of the ground, similar to those indicative of the approaching movements of its enemy, than it makes a speedy escape to the surface. Every boy knows how to take advantage of this to procure fish baits, by thrusting a spade or a stake into the ground, and moving it backwards and forwards, to imitate the advance of a mole burrowing in search of prey. The worm, unable from its instinct to discriminate between its subterranean enemy and the spade, darts into daylight, and is instantly captured for the boy's bait-bag. The lapwing (*Vanellus cristatus*, MEYER,) it is stated by Dr. Anderson in his 'Bee,' is aware of this instinctive fear in the earth worm of subterranean concussions or noises; and when it cannot find sufficiency of slugs,* &c. above ground, it pats with its feet, till the earth worms, mistaking it for an advancing mole, come forth to be feasted upon.

IMPROVEMENTS MADE BY SMALL AND POOR FARMERS.

The extracts from the British Farmer's Magazine in this No. (page 724) were copied from another print, our January number of that work not having then arrived. Since its reception, we find that the most interesting facts connected with the statements there given, were omitted, and which we will now supply. The meeting was at a public dinner given by the Earl of Gosford, to his deserving tenants, with many other invited guests, and the object was to distribute prizes for, and to celebrate the valuable labors and improvements of the preceding year. It was these labors that were stimulated and brought to such important ends, by the instruction and encouragement of Mr. Blacker,

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* "Nourriture;—insectes, araignées, vers, et petits limaçons." TEMMINCK, Manuel d'Ornithologie, p. 552, 2d edit.

of whose operations some account was given in our last number: and the fruits, presented in the products of these small farmers, certainly place Mr. Blacker's services in a much higher position than would have appeared from the previous account alone, highly as we then thought and spoke of them.

THE SEASON THROUGH APRIL.

The spring to this time, (April 28th,) has been as remarkably cold, for the time of year, as the winter had been below the temperature of our usual cold season. The corn planting has been made very late, by wet, as well as by cold weather: and those farmers who, on warm and dry soils, had been enabled to plant earlier, have had the leaves of all the young plants which had come up, cut down by severe frost. There will be very little if any early fruit. The wheat crops generally through the country show almost unprecedented injury from the severe cold of winter. On the rich low grounds of the upper James River, usually sown entirely in May wheat, the destruction is greater than is known elsewhere. From a private letter (of March 31) from the owner of a body of this very fertile and valuable kind of land, in Goochland, we take the following statement. "Our May wheat, on the stiffest James River low grounds above the falls, is so entirely destroyed by the severity of the winter, that some have already decided to sow the land in oats—and all are hesitating whether it is not advisable, and only waiting the latest hour that it will answer to sow oats, to decide—to see what change may possibly take place in that time. At present, the prospect appears utterly hopeless. Other wheats are much injured—but this is the worst."

In our own neighborhood, the wheat on marled land, having been in a measure protected by the peculiar *warming* power of that manure, shows a superiority to wheat on other lands, much greater than in proportion to the mere difference of fertility—and it may be anticipated that the benefit of marl on wheat this year, will be double as much as is generally seen after favorable winters.

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2. Or five *new* subscribers by sending their names and $20 at one time, will receive their copies for one year, for that sum, or at $4 for each. Purchasers of any 5 volumes (except Vol. I.) at one time in like manner, shall have them for $20.

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For the Farmers' Register.

MONTHLY COMMERCIAL REPORT.

The business of the present month has been at advanced prices on every article of domestic produce—and foreign commodities generally have also brought higher rates.

Tobacco is sold at prices beyond what have been current for several years past. General sales $5 50 to $11—extreme prices $5 to $14. Supplies begin to arrive freely, but of the extent of the crop no correct estimate can yet be made.

Cotton has also advanced to unusual rates. It is now 1½ cents per pound higher than last month: sales to some extent having been made in Petersburg at 17 to 18 cents. Supplies which were kept back by the inclemency of the winter begin to appear, but only in moderate quantities, and nearly the whole that remains in the country will probably be at market during the ensuing month. It will require a considerable advance in foreign markets to pay the prices given here for both cotton and tobacco. Whether there is any good grounds for expecting such an advance, it is difficult to say. The increased consumption of cotton is doubtless calculated on—but this does not apply to tobacco.

A small improvement has taken place in the price of flour, which may be ascribed to the apprehension of a short crop of wheat. It is said that the fields in Virginia never presented a more barren aspect—the effect of the severest winter of the present century.

Money continues to be plentiful, particularly in the large cities, which have generally received an accession of banking capital. The rate of exchange on England has been from 8½ to 9 per cent. premium, and some shipments of specie were consequently made. Stocks of all kinds keep up; and among those which are getting into favor, it is pleasing to enumerate those of the rail road companies both at Richmond and Petersburg. A new work of this description is about to be undertaken by the enterprising citizens of the latter place—to wit, a branch from their present rail road, to Wilkins' Ferry on the Roanoke River, at a point above the principal obstructions to the navigation, and but little affected by freshets or low water—possessing also the advantage of a landing immediately at the road, and avoiding some of the expenses at present incurred. This new rail road will offer a great facility to the growers of tobacco and wheat on the Roanoke, as well as to a portion of the cotton country. The work will be commenced forthwith. The operations on the Richmond and Potomac road are continued with great spirit—those on the great James River and Kanawha work are about to be commenced.

X.

April 27, 1835.